URBAN WATER RESOURCES MANAGEMENT STUDY

HOUSATONIC RIVER BASIN
CONNECTICUT

PLAN OF STUDY

U.S. ARMY CORPS OF ENGINEERS
NORTH ATLANTIC DIVISION

JUNE 1974

MEMORANDUM

TO: Reviewers, Housatonic Urban Water Resources Plan of Study

SUBJECT: Change Notices

All changes including replacements for the "Draft" plates and corrigenda will be transmitted under separate cover as Change Notices.

Change Notices

To keep the Plan of Study up-to-date Change Notices will be issued as necessary. These notices will be dated and numbered chronologically. Receipt and entry of such Change Notices should be recorded in this Section so that as subsequent Change Notices are received, users can check to assure that earlier Change Notices were received, entered and recorded.

Change Notice #	Date	Received, Entered, and Filed by

PREFACE

This document includes information relative to the entire Housatonic Basin, including those portions in the States of Massachusetts and New York. However, this study is specifically oriented to that portion of the basin within the State of Connecticut, as authorized by Congressional Resolution. It is anticipated that a Resolution to include Massachusetts will be approved by Congress. Coordination with all three basin states is expected to facilitate an orderly expansion of the scope of study, should the resolution be approved.

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INTRODUCTION

The preparation of this plan of study was the first major task to be undertaken in the conduct of a Congressionally authorized study of the water resources and related land-use problems of the Housatonic River basin in Connecticut. It has been prepared through the cooperation of the member agencies of the Connecticut Interagency Water Resources Planning Board, the Directors of the regional planning agencies within the basin, Region I of the Environmental Protection Agency and the New England and North Atlantic Divisions of the Corps of Engineers.

The purpose of the plan of study is to provide a dynamic framework of information upon which to structure the later stages of the study. Further, the plan of study provides a tool to facilitate management, to serve as an agreement of participation by all pertinent federal and non-federal agencies concurrring in its content and as a basis for review and budget approval by higher authority.

The plan sets forth a two year schedule of work tasks to accomplish national, state and local objectives in wastewater management, water supply, and flood control. Other water resource areas such as recreation, navigation, and conservation of fish and wildlife will be considered in the context of multiple objective planning as they relate to the major work items. Included are estimates of total and task related costs in terms of dollars and man-years. The total Federal expenditures are estimated to be $1.2 million, with a non-federal (state supported) effort of $260,000, including $200,000 required to support the total wastewater effort.

This document serves as a multiple-party agreement between the responsible agencies and establishes a study management system incorporating maximum public involvement. The major partners in the study are the State of Connecticut, the Regional Planning Agencies and the Corps of Engineers.

The primary focus of the study is to address urban water resource problems. However, rural problems that impact directly upon the urban portion of the Housatonic River Basin will also be studied. Rural problems which do not affect urban areas will be addressed for the purpose of identification and recommendations relative to continuing planning programs.

AUTHORITY

This study was authorized by resolution adopted by the Committees on Public Works of the U.S. Senate on 25 May 1972 (Appendix A) and the U.S. House of Representatives on 14 June 1972 (Appendix B). It was resolved by these Committees:

"That the Secretary of the Army, acting through the Chief of Engineers, is hereby authorized, in connection with the preparation of plans to meet the long-range water needs of the northeastern United States as authorized by Section 101 of Public Law 89-298, to cooperate with the State of Connecticut in conducting a study to recommend improvements in wastewater management and alternatives thereto within the Housatonic River Basin. The scope of such study shall be established with the consultation of the State of Connecticut and the Environmental Protection Agency and shall include measures for wastewater management including cleanup and restoration in the interest of water supply, environmental quality, recreation, fish and wildlife, and other allied water purposes, and shall be conducted with the participation, consultation, and cooperation of the Environmental Protection Agency and state and local water pollution control agencies and, where appropriate, state and local agencies with environmental planning responsibilities."

URBAN STUDIES PROGRAM OBJECTIVES

The basic goal of the Urban Studies Program is to develop water and related resources plans for specified urban areas of the United States that not only offer realistic prospects for solving specific urban water problems but, equally important, also have the potential to serve as a catalyst for solving other related problems.

The water and related resources plans will be developed to meet the following objectives:

(1) Address the specified problems, issues, and concerns of the regional publics by responding to expressed public desires and preferences;

(2) Be flexible to accommodate changing economic, social and environment patterns and changing technologies;

(3) Integrate with and be complementary to other urban development and management programs;

(4) Be fully coordinated with affected public agencies at all levels;

(5) Be developed through an orderly, structured, and open planning process;

(6) Be capable of implementation, with respect to financial and institutional capabilities and public concensus; and

(7) Where appropriate, be certified by applicable state and Federal Agencies.

Meeting the goal and the objectives of the Urban Studies Program through the planning process will consist of the following:

(1) A series of three to seven alternative urban water resources plans to meet long range (approximately 50 years) needs, from which a choice may be made prior to completion of the study;

(2) A priced and evaluated portion of each of the alternative urban water resource plans to meet short range (approximately 20 years) needs;

(3) A phased early action program for the study region for each alternative urban water resource plan to meet short range (approximately 20 years) needs; and

(4) If appropriate, a proposal for Congressional authorization of selected elements of the early action program of the publicly selected "best" plan where these selected elements are traditional Corps of Engineers functions.

SECTION II

STAGE ONE STUDY RESULTS

Identification of the Study Area

Description of Existing Problems

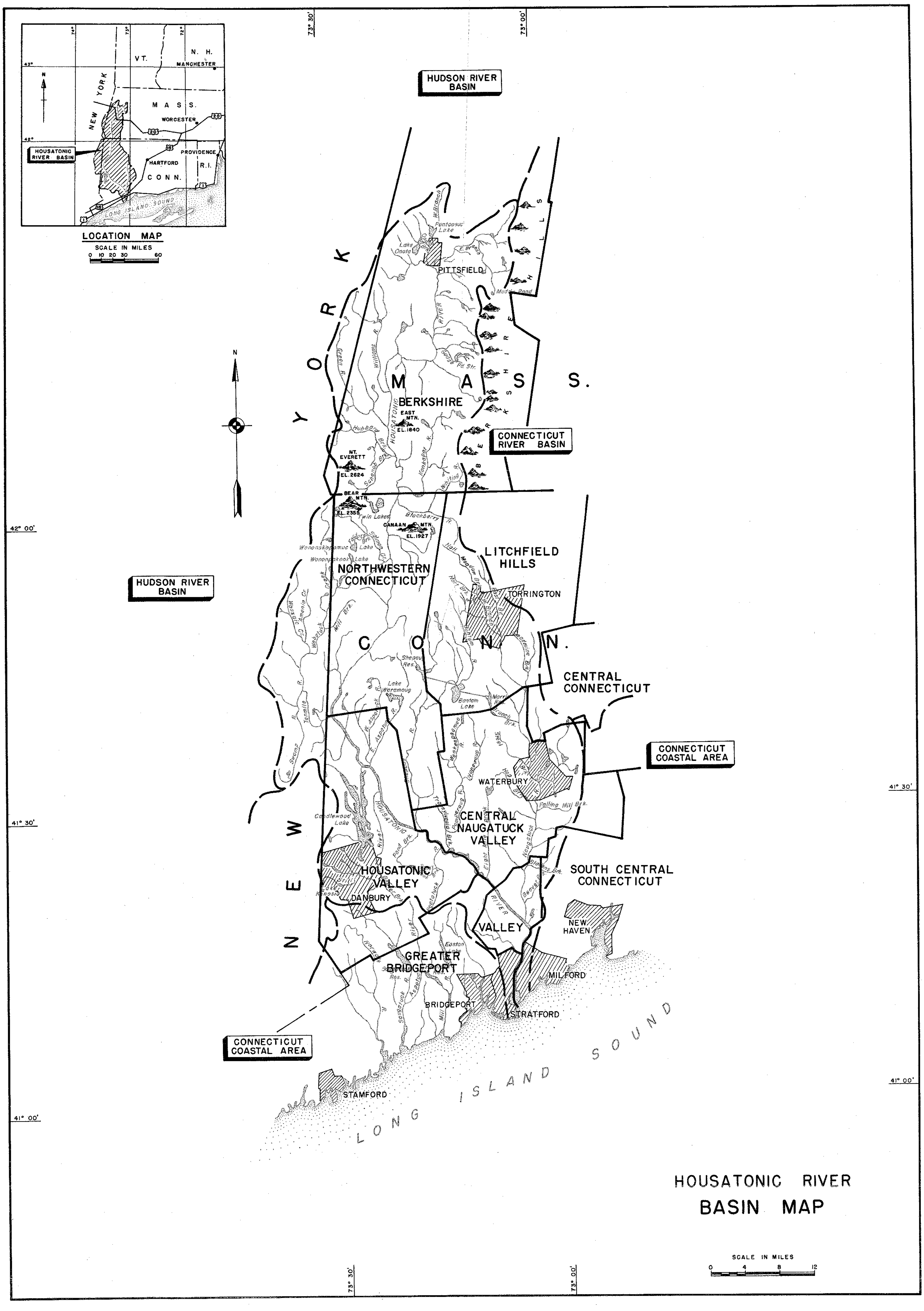
Statement of Study Planning Objectives

Current Planning and Related Data

Public Involvement Strategy

Institutional Arrangements

Study Management


LOCATION MAP
SCALE IN MILES
0 10 20 30 60
VT.
N. H.
MANCHESTER
NEW YORK
MASS.
WORCESTER
HOUSATONIC RIVER BASIN
PROVIDENCE
HARTFORD
R.I.
CONN.
LONG ISLAND SOUND
73° 30'
73° 00'
HUDSON RIVER BASIN
NEW YORK
MASS.
CONN.
BERKSHIRE HILLS
PITTSFIELD
Pontoosuc Lake
Lake Onota
BERKSHIRE
EAST MTN. EL.1840
MT. EVERETT EL.2624
BEAR MTN. EL.2355
CANAAN MTN. EL.1927
CONNECTICUT RIVER BASIN
LITCHFIELD HILLS
TORRINGTON
NORTHWESTERN CONNECTICUT
HUDSON RIVER BASIN
CENTRAL CONNECTICUT
CONNECTICUT COASTAL AREA
WATERBURY
CENTRAL NAUGATUCK VALLEY
HOUSATONIC VALLEY
DANBURY
SOUTH CENTRAL CONNECTICUT
VALLEY
NEW HAVEN
GREATER BRIDGEPORT
MILFORD
BRIDGEPORT
STRATFORD
CONNECTICUT COASTAL AREA
STAMFORD
LONG ISLAND SOUND
42° 00'
41° 30'
41° 00'
HOUSATONIC RIVER
BASIN MAP
SCALE IN MILES
0 4 8 12

Location

The Housatonic River Basin lies principally in the western part of Connecticut and the southwestern corner of Massachusetts with a small portion extending into eastern New York. (Plate 2-1). It is bordered on the west and north by the Hudson River watershed, on the east by the Connecticut River Basin, and on the south and southeast by the Connecticut Coastal Area. The basin is roughly elliptical in shape with a maximum width in an east-west direction of 35 miles and maximum length in a north-south direction of 98 miles. It comprises an area of 1,950 square miles of which 1,232 are in Connecticut, 500 in Massachusetts and 218 in New York.

The Housatonic River follows a southerly course from Pittsfield, Massachusetts through Connecticut to Long Island Sound. Its total length is approximately 132 miles and has a total fall of 959 feet. Major tributaries include the Naugatuck, Shepaug, Pomperaug, and Still Rivers.

The Study Area is limited to the area within Connecticut, which includes the middle and lower portions of the Housatonic Basin and the major tributaries mentioned above. Five Regional Planning Agencies (RPA's) are located within the Study Area and three RPA's, encompassing the metropolitan areas of Bridgeport, New Haven and Bristol, exist on the Study Area's periphery.

Topography, Geology, Climate

Much of the Housatonic River Basin consists of rolling hills with steep-sided mountains rising to elevations of 2600 feet around the northern perimeter of the basin. The relief becomes more moderate in the middle portion of the basin with elevations of 1200 to 1500 feet. In the lower part of the basin, the even crested hills rise approximately 500 feet above the valley floor. The hilly topography and narrow flood plains in the northern and middle portions of the basin have limited development to small villages, with the exception of Pittsfield, Massachusetts and Torrington, Connecticut, which are built on larger flood plains at the confluence of major rivers. The more moderate topography in the lower Housatonic and Naugatuck basins has allowed these areas to develop as major population and manufacturing centers.

The bedrock of the region consists primarily of gneiss, schist and marble. In the upper and middle portions of the Housatonic basin, 5% to 10% of the land is exposed bedrock and 25% to 30% of the land has bedrock within 10 to 15 feet of the surface. Glacially influenced, hard pan soils are found in both sparsely and densely settled areas, where, as in the case of the latter, poorly drained soils contribute to a high rate of septic tank failures. Scattered deposits of sand and gravel, particularly along the rivers, are potentially good water supply acquifers.

The average annual temperature in the basin varies from about 50°F near Long Island Sound to 44°F at points in the northern portion. Average annual rainfall varies from approximately 47 inches on the coast to about 44 inches at Pittsfield, Massachusetts. The average annual runoff for the basin is about 22.5 inches a year, nearly 50% of the average annual precipitation.

Cultural and Aesthetic Characteristics

The Housatonic River Basin, with its rolling, forest covered hills is an area of great natural beauty only several hours from major metropolitan centers in New York, Connecticut and Massachusetts. Numerous wetlands, lakes and streams, many of which are part of the state parks and historical sites that dot the area, offer residents of the basin recreational, scenic, and cultural amenities of high quality. Lakes Candlewood, Lillinonah, Zoar, and Bantam Lake, the largest natural water lake in the basin, provide a wide range of water-related recreational opportunities. Numerous small villages, nestled between the hills in the upper and middle portions of the basin, still retain their original colonial character.

The major urban centers, particularly those in the Naugatuck Valley and the lower Housatonic Valley, provide educational and cultural opportunities such as libraries, theatres and music. The Shakespeare Theatre, located at the mouth of the Housatonic River in Stratford, has received wide acclaim for its productions.

Demographic Characteristics

The population of the basin, based on the 1970 census, is estimated to be 560,000 people, an increase of 85,000, or nearly 18 percent over the 1960 census data. All but 8000 of the increase occurred in Connecticut, especially in the southern portion of the basin. Of the total 1970 basin population, Connecticut was estimated to have 444,000, Massachusetts 98,000 and New York 18,000.

The major urban centers in the basin, with exception of Pittsfield, Massachusetts and Danbury, Connecticut, are located in the Naugatuck and lower Housatonic Valleys. While the population of the central cities remained relatively static between 1960 and 1970, the surrounding areas experienced rapid growth. For example, Waterbury increased by only 0.8% while the surrounding area grew by 30.3%. The most dramatic growth during the 1960-1970 decade occurred in the Danbury area where the population increased by 59%.

More than 40% of the labor force in the Naugatuck and lower Housatonic Valleys is employed in manufacturing industries while the per cent employed in such industries ranges from less than 20% to 30% in the more rural areas of the basin. Median family income tends to be less in manufacturing centers such as Waterbury, where median family income is between $10,000 and $11,000 per year. On the other hand, the relatively affluent Danbury area had a 1970 median family income of $12,600. Socio-economic characteristics of the basin population are displayed in Table 2-1.

Economic Activity

Manufacturing is the most important element in the economy of the basin. The rapidly flowing Naugatuck River in particular has attracted water-using manufacturing concerns to its banks, especially industries that specialize in the production of non-ferrous metal and rubber products. Although much of the industrial activity is still located along the Naugatuck and lower Housatonic Rivers, to the detriment of water quality, new industrial parks on major transportation routes have attracted new or relocated industries. Likewise, the construction of suburban shopping centers has stimulated and dispersed economic activity, thereby reducing the relative importance of the central cities as centers of commerce and industry.

Tourism is an important element in the economy in the sparsely populated upper and middle portions of the basin. Principal summer resort centers are Lenox, Lee, Stockbridge and Great Barrington, Massachusetts and Lakeville and New Milford, Connecticut. The economy of these areas is bolstered by a heavy influx of summer residents clustered around the numerous lakes and ponds.

Land Use

Land use in the Naugatuck and lower Housatonic Valleys is reflective of the region's dense population and heavy industry. Major highway and railroad networks service the many riverfront industries and downtown and suburban shopping centers. Much of the housing is concentrated in high density (less than 1/2 acre per dwelling unit) areas, although an increasing percentage of the population lives in suburban tract developments with densities ranging from 1/2 acre to 1 acre per dwelling unit.

Except for the region mentioned above, much of the existing land use in the basin is woodland and agricultural, with low density residential areas scattered throughout. Small concentrations of middle density and high density residential uses occur in some of the town centers.

Water Resource Facilities

Major water suppliers in the basin include both metropolitan and investor owned utilities. The Waterbury Water Department is the largest, serving 120,000 people with a safe yield of 30 mgd. The investor owned New Haven Water Company, serving a population of 394,000 with a safe yield of 66 mgd, and the Bridgeport Hydraulic Company, serving 338,500 people with a safe yield of 74 mgd, provide water for the New Haven and Bridgeport metropolitan areas, which lie partially within the basin. Altogether, there are fourteen water suppliers which serve a population of at least 5,000. Information on these water supply utilities is given in Table 2-2.

Wastewater treatment facilities in the basin include a large number of individual septic systems, primary, secondary plants, and a tertiary plant serving Heritage Village in Southbury. In addition, a tertiary land treatment system has been proposed in Litchfield. Detailed statistics for the wastewater treatment plants in the basin are given in Table 2-3.

Flood control projects in the basin include dams and local protection works. Seven dams have been built, all within the Naugatuck River subbasin, which is particularly subject to floods. Five local protection works have been completed, and one is ready for construction. These projects are detailed in Table 2-4. Also, a Flood Plain Information report for the Naugatuck River in the towns of Ansonia, Seymour, Beacon Falls, Naugatuck, Watertown, and Thomaston and the city of Waterbury was released in June 1973. This report gives a history of flooding in this area and identifies those areas that are subject to possible future floods.

Table 2-1
Socio-Economic Characteristics of Basin Population

Regional Planning Agencies

Region	1960 Pop.	1970 Pop.	% Increase	Median Income 1970 ($)	% Employed in Manufacturing 1970
Central Naugatuck	195,552	229,360	17.2%	11,484	43.9%
Valley	60,241	73,829	22.5%	11,327	49.8%
Housatonic Valley	83,932	133,525	59.1%	12,600	33.2%
Litchfield Hills	57,487 (basin portion only)	63,845 (basin portion only)	11.0%	10,924	39.5%
Northwestern	16,069	18,252	13.5%	-	32.7%

Major Cities

City	1960 Pop.	1970 Pop.	% Increase	Median Income 1970 ($)	% Employed in Manufacturing 1970
Waterbury	107,130	108,033	0.8%	10,459	43.3%
Milford	41,662	50,858	22.1%	12,414	39.8%
Danbury	39,382	50,781	28.9%	11,394	37.3%
Stratford	45,012	49,775	10.6%	12,268	46.6%
Torrington	30,045	31,952	6.3%	10,484	44.4%
Shelton	18,190	27,165	49.3%	12,099	49.1%
Naugatuck	19,551	23,034	18.1%	11,522	55.4%
Ansonia	19,819	21,160	6.8%	10,571	50.2%

Table 2-2
Water Supply Utilities

Serving a Population of 5,000 and Over

Name of Utility	Town Served	Ownership	Population Served	Safe Yield (mgd)
Ansonia Water Co.	Ansonia Derby[1] Seymour[1]	Investor	19,750	3.37
Bethel Water Dept.	Bethel	Municipal	5,500	1.30
Birmingham Water Co.	Derby Seymour[1] Ansonia[1]	Investor	12,450	3.10
Bridgeport Hyd. Co.[2]	Monroe[3] Shelton Stratford[3] Trumbull[3] Newtown[1,3]	Investor	338,500	74.0
Conn. Water Co. -Naugatuck Div.	Naugatuck Beacon Falls[1]	Investor	17,150	4.7
Danbury Water Dept.	Danbury[3]	Municipal	35,000	6.2
New Haven Water Co.[2]	Orange[3] Woodbridge[3] Milford[3] Bethany[3]	Investor	393,905	66.4
Ridgefield Water Supply Co.	Ridgefield[3]	Investor	8,250	.625
Seymour Water Co.	Seymour Beacon Falls Oxford[1]	Investor	9,000	1.66
Torrington Water Co.	Torrington[1]	Investor	24,000	4.3
Waterbury Water Dept.	Waterbury Middlebury[1] Watertown[1]	Municipal	120,000	30.0
Watertown Fire Dist.	Watertown	Municipal	5,700	1.25

Table 2-2 (Cont'd)
Water Supply Utilities

Serving a Population of 5,000 and Over

Name of Utility	Town Served	Ownership	Population Served	Safe Yield (mgd)
Watertown Water and Sewer Authority	Watertown	Municipal	8,000	-
Winsted Water Works	Winchester[3]	Municipal	8,300	2.62

LEGEND

1- Designates Water Utility not a principal supplier of the town
2- Designates service area which also includes towns outside Housatonic River Basin
3- Designates town partially outside Housatonic River Basin

Table 2-3
Sewage Treatment Plants

Region	Town	Type[1]	Average Daily Flow (mgd)
Central Naugatuck	Beacon Falls	Activated Sludge	.034
	Heritage Village	Tertiary	.45
	Naugatuck	Primary (Activated Sludge under construction)	1.52
	Thomaston	Activated Sludge	.656
	Waterbury	Primary (Activated Sludge under construction)	23.43
	Watertown	Trickling Filter	1.131
Valley	Ansonia	Activated Sludge	2.70
	Derby	Primary (Activated Sludge under Construction)	1.690
	Seymour	Activated Sludge	.620
	Shelton	Trickling Filter, Sand Filter (will abandon to Riverdale plant by 6/75)	.030
		(Riverdale - Primary; Activated Sludge under construction)	1.498
Housatonic Valley	Bethel	Activated Sludge	.530
	Danbury	Trickling Filter	9.13
	New Milford	Activated Sludge (under construction)	.461
	Newtown[2]	Activated Sludge (under construction)	.430
	Ridgefield	Activated Sludge	.559
Litchfield Hills	Litchfield	Activated Sludge	.3
	Norfolk	Activated Sludge, Sand Filter	.212
	Torrington	Activated Sludge	8.50
Northwestern	Kent	Activated Sludge	.029
	North Canaan	Activated Sludge	.327
	Salisbury	Activated Sludge, Sand Filter	.155
Greater Bridgeport	Stratford	Primary (Activated Sludge under construction)	6.69

LEGEND

1- All plants chlorinate effluent
2- anticipated "on-line" or initial flow when new treatment plant becomes operational.

Table 2-4
Authorized Flood Control Projects
Housatonic River Basin

Dams and Lakes

Name	River (All in Naugatuck River sub-basin)	Drainage (sq. mi)	Flood Control Storage (ac. ft.)	Status
Hall Meadow Brook	Hall Meadow Brook	17.2	8,620	Complete
East Branch	East Branch, Naugatuck	9.3	4,350	Complete
Thomaston	Naugatuck	97.0	42,000	Complete
Northfield Brook	Northfield Brook	5.7	2,430	Complete
Black Rock	Branch Brook	20.4	8,700	Complete
Hancock Brook	Hancock Brook	12.0	4,030	Complete
Hop Brook	Hop Brook	16.4	6,970	Complete

Local Protection Works

Location	River	Status
Torrington[1]	East Branch, Naugatuck	Complete
Torrington[1]	West Branch, Naugatuck	Complete
Waterbury-Watertown[1]	Naugatuck	Complete
Ansonia-Derby	Naugatuck	Complete
Derby	Housatonic + Naugatuck	Complete
Danbury	Still	Under design

1- Small flood control projects not specifically authorized by Congress

DESCRIPTION OF EXISTING PROBLEMS

Existing problems in the study area are both basin-wide and regional in scope. Coordination and public involvement efforts with the state and the regional planning agencies have resulted in a delineation of three major problem areas: wastewater management, water supply, and flood control. A basin-wide overview of these problems is presented followed by a regional description based on the data furnished by each of the five RPA's in the study area.

Wastewater Management

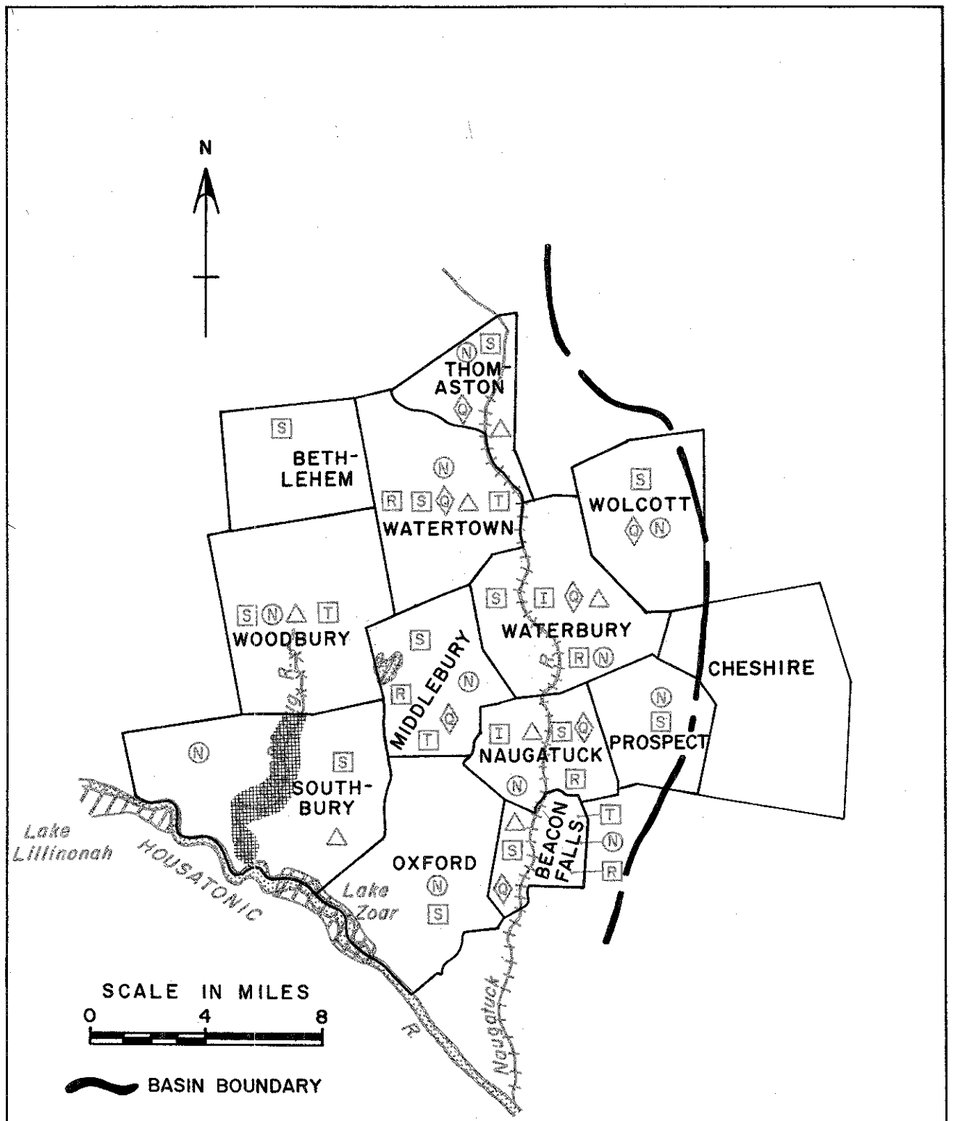
The most widespread wastewater problems in the basin are septic tank failures, infiltration of groundwater into sewer lines, and need for sewer construction, repair, or extension, and the need to upgrade, expand, or construct treatment facilities. These problems are most noticeable in their effect upon surface water quality; especially in areas of population and industrial concentration. The stream segments of the basin which are most grossly polluted are the Still River which drains the Danbury area, the Naugatuck River from Thomaston to the confluence with the Housatonic, and the lower Housatonic from the Naugatuck River to the Sound.

In the State of Connecticut, 20,000 individual septic systems fail each year. Many of these failures are caused by development that is incompatible with soil conditions. Subdivisions built on poorly drained soils during the 1960's drought when water tables were low are now experiencing septic tank problems because water tables have returned to normal levels. New developments, such as these subdivisions, typically occur at the fringe of existing urban areas and must eventually be tied-in to the existing sewer system, or new facilities must be installed, often at great cost.

Septic tank failures in areas with suburban densities are the most obvious examples of land use that is incompatible with the existing natural resource base. The State of Connecticut, through its Plan of Conservation and Development, has recognized the need to promote orderly growth in order to protect valuable natural resources such as water from potentially harmful land uses.

Water Supply

Connecticut State law provides that a surface water supply source must be free of effluent discharge, no matter how well treated. Many



CENTRAL NAUGATUCK VALLEY REGION

LEGEND

WASTEWATER PROBLEMS

- Stream pollution
- Septic tank failures — T
- Infiltration — I
- Eutrophication
- Storm sewer point pollution sources — S
- Need construction, repair, or extension of sewer lines — R

WATER SUPPLY PROBLEMS

- New supply source needed — N
- Surface water contamination — C

FLOOD CONTROL PROBLEMS

- River flooding
- Bank erosion
- Encroachment into flood plain

LAND USE PROBLEMS

- Deteriorating, congested riverfront
- Reclamation of open pits caused by sand and gravel industries needed — G
- Large tracts of land in public ownership reduce local tax base — L
- Urban development restricted by water supply water shed — W
- Urban development restricted by stream quality limitation — Q

aquifers, reservoirs and surface waters have been contaminated by industrial wastes or incompatible land uses. Consequently, the state must develop new supply sources, protect existing ones, and protect future reservoir sites from further development. An area with a critical need for water supply facilities is southwestern Connecticut, including the Danbury area which is in the Housatonic basin. Another critical area is the Naugatuck Valley with its high industrial demand.

Flood Control and Flood Plain Management

Although serious flood problems have occurred in the Housatonic basin in the past, especially along the Naugatuck River, extensive flood control programs of the Corps of Engineers have alleviated many of these problems. However, local protection is needed in certain other areas that have been designated by the state.

A flood plain management program is needed to regulate further development on flood plains and to prevent incompatible new development. Additional flood plain delineation surveys are needed, and local flood plain zoning ordinances must be implemented in some towns.

Central Naugatuck Region

Many water-related problems in this region have resulted from the existence of a major manufacturing center on the Naugatuck River. Water pollution has been caused by industrial processes and by the large volume of sewage produced by several urban communities near the river. During periods of low flow, the river's capacity is inadequate to purify wastes, including effluent discharged from five secondary treatment plants. Without tertiary treatment and low flow augmentation of the river, the towns of Watertown, Waterbury, Wolcott, Beacon Falls, Naugatuck, and Middlebury, which constitute a major employment and service center, must restrict their growth.

Hard pan soils and small leaching fields have caused sewage disposal problems in certain subdivisions. Due to septic tank failures in several towns, sewer lines have been programmed or installed. However, many towns still allow unsewered lots less than one acre, even in hard pan soil areas. Conversely, two towns have planned widespread sewerage systems, including large areas zoned for lots over one acre where sewer service is expensive and inefficient. Other waste water problems include: storm water overflow connections to sanitary sewerage systems; significant levels of infiltration of groundwater into sewerage lines in Naugatuck and Waterbury; a proposal to construct three industrial parks without sewers; difficulty in making cooperative agreements regarding sewage transfer and cost; and lack of reasonable user-charges in several municipalities.

New water resources are needed in the Naugatuck and Pomperaug River Watersheds by 1980. Potential impoundments and groundwater sites exist, all of which must be protected from pollution. Industrial pollution precludes the use of ground water adjacent to the Naugatuck River as a source of water supply. Sulphates, iron, and manganese from the river would infiltrate and contaminate the groundwater. Due to fragmentation of ownership and management, most of the water utilities are small and coordination of supply and service is lacking. The existence of five investor owned water companies whose water sources and land holdings come under little local control is cause for concern, particularly with growing financial pressure on the companies to dispose of watershed land. Conversely, the water companies have little control over the land uses in their watersheds.

In addition to continued flood danger in parts of the heavily built up Naugatuck River flood plain, the Pomperaug River is subject to flooding, with at least 20 houses regularly threatened. Encroachment into the flood plains continues, and only Waterbury and Southbury of the thirteen municipalities within the region have adopted flood plain zoning. Bank erosion is also a problem as is frost heaving of roads in areas of hard pan soils where storm drainage is lacking.

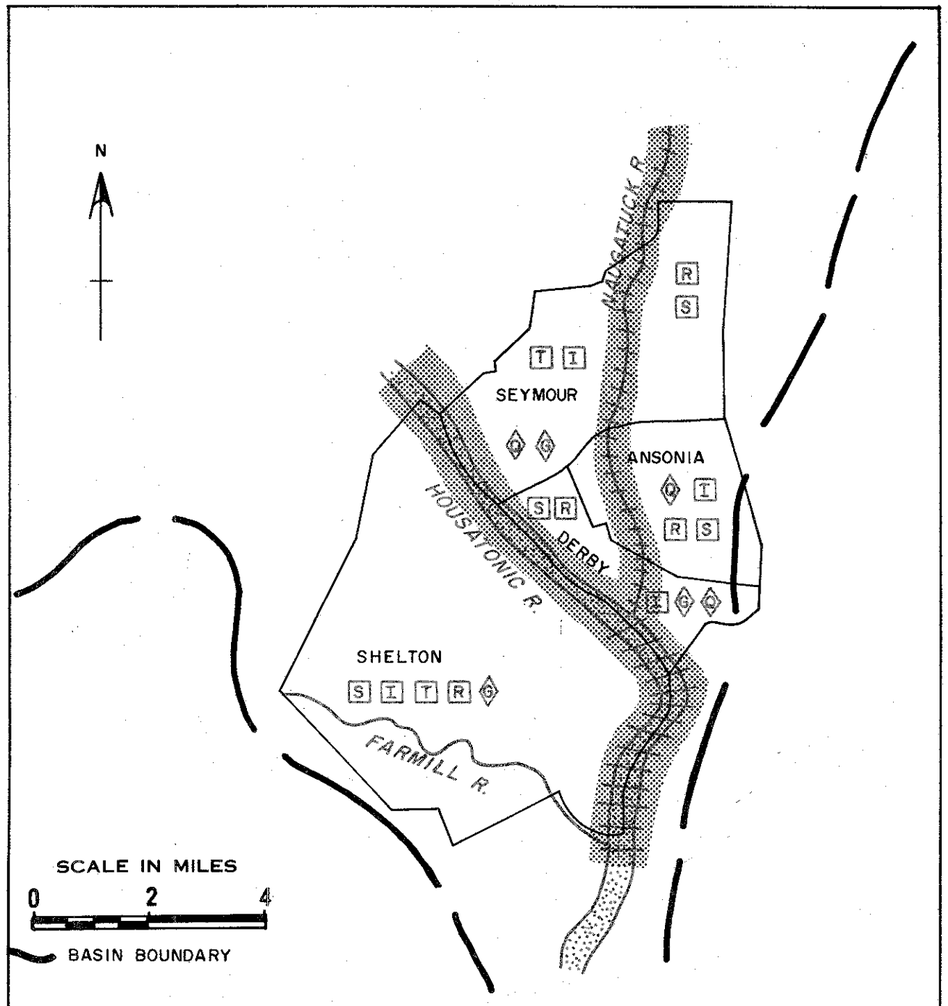
Water-related recreation is in short supply in the Central Naugatuck region. Existing facilities are overcrowded and potential assets such as the Naugatuck River are precluded from recreational use by their polluted condition. Other sites such as Lake Quassapaug could be degraded by more intensive use. Eutrophication is a problem on this lake, on Lake Lillinonah and on other smaller water bodies. The majority of flood control facilities in the region are not suitable at present for swimming or boating.

Valley Region

Two broad interrelated problem areas, water/sewer service and the misuse of river and surrounding land resources, have been identified in the Valley region. Although three primary sewage treatment plants exist in close proximity to each other at the confluence of the Naugatuck and Housatonic Rivers, each plant is managed and operated without coordination between the respective municipalities. Low density residential development in poorly drained areas of Shelton, dependent on septic and private well systems, has resulted in surface leaching and potential contamination of groundwater. The low density makes the installation of sewers and public water facilities prohibitively expensive.

Private water companies own vast tracts of land which are potentially subject to sale and development. Local and regional plans assume that this land will remain undeveloped. Since projections of population and related services are based on this assumption, the sale and subsequent development of water company holdings would severely increase pressures on public services.

Waterfront areas in the Lower Naugatuck Valley are choked by factories, railroads, and highways. However, a transition from manufacturing to service functions has begun, threatening the operations



VALLEY REGION

LEGEND

WASTEWATER PROBLEMS

- Stream pollution
- Septic tank failures — T
- Infiltration — I
- Eutrophication
- Storm sewer point pollution sources — S
- Need construction, repair, or extension of sewer lines — R

WATER SUPPLY PROBLEMS

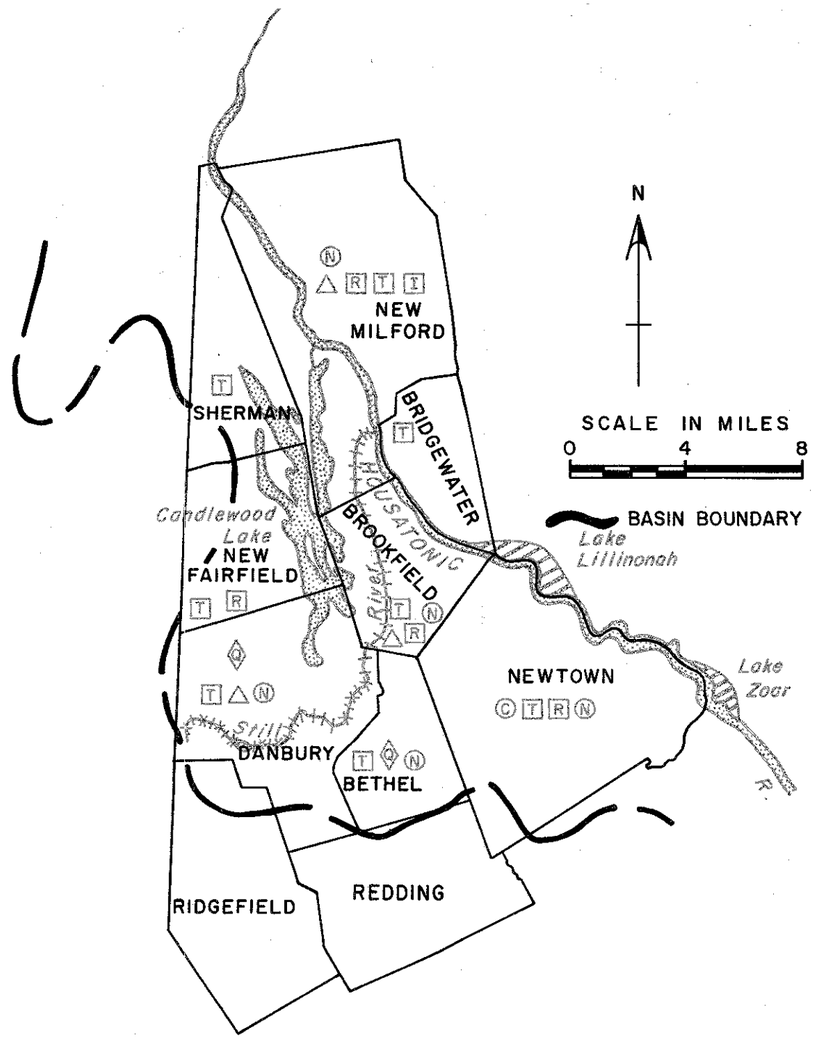
- New supply source needed — N
- Surface water contamination — C

FLOOD CONTROL PROBLEMS

- River flooding
- Bank erosion
- Encroachment into flood plain

LAND USE PROBLEMS

- Deteriorating, congested riverfront
- Reclamation of open pits caused by sand and gravel industries needed — G
- Large tracts of land in public ownership reduce local tax base — L
- Urban development restricted by water supply water shed — U
- Urban development restricted by stream quality limitation — Q



HOUSATONIC VALLEY REGION

LEGEND

WASTEWATER PROBLEMS

- Stream pollution
- Septic tank failures — T
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- Eutrophication
- Storm sewer point pollution sources — S
- Need construction, repair, or extension of sewer lines — R

WATER SUPPLY PROBLEMS

- New supply source needed — N
- Surface water contamination — C

FLOOD CONTROL PROBLEMS

- River flooding
- Bank erosion
- Encroachment into flood plain

LAND USE PROBLEMS

- Deteriorating, congested riverfront
- Reclamation of open pits caused by sand and gravel industries needed — G
- Large tracts of land in public ownership reduce local tax base — L
- Urban development restricted by water supply water shed — U
- Urban development restricted by stream quality limitation — Q

of several factories. Preferences have been expressed to redevelop the waterfront for open space and water recreation activities. Zoning regulations must be adopted to reflect these preferences.

Sand and gravel excavation industries have done much damage to the land bordering the rivers. Legislation and litigation have been initiated to stop future excavation, but the abandoned sites which scar the riverfront and bluffs will need reclamation for both aesthetic reasons and soil conservation purposes.

Housatonic Valley Region

The Housatonic Valley region is the fastest growing region in Connecticut and many of the region's current problems have resulted from the dramatic growth during the 1960-1970 decade. During that period, the region's non-institutional population grew from 83,932 to 133,525, an increase of 59.1%. Increasing burdens are being placed on the region's water-related resources. Problems have been identified in relation to waste treatment, water supply, recreation and flood control.

Septic system failures are a problem in the region. More than half of the population depends on individual septic systems for waste disposal. Only four of the region's ten municipalities have sewer systems. A state order requiring the installation of a sewer system serving the towns of Brookfield, New Milford, and New Fairfield has led to controversy over the feasibility and safety of placing sewer collectors and an interceptor under Lake Candlewood. In addition, Newtown has been ordered to install a sewer system. The proposed systems discussed above will discharge effluent into the Housatonic River. Two of the existing systems empty into the Still River, which flows into the Housatonic in this area, and effluent has already created pollution which will increase without advanced treatment.

Approximately 60% of the region's population relies on individual home wells or small community systems as sources of water supply. Many of the community systems have been unreliable and have run dry. The remaining 40% of the population is served by public water systems. In order to estimate future water demand and the spatial distribution of users, eleven "load centers" have been identified which will depend on public water supply systems. The maximum population projected for the load centers will generate a demand ranging from an average of 37.99 MGD to a maximum of 75.98 MGD. The region's present estimated safe yield is only 12.59 MGD. Potential new surface supply sources, capable of supplying 30 MGD, would be inadequate to meet future demands. Additional constraints, such as the high cost of impoundment site acquisition, potential pollution from development within reservoir watersheds, and jurisdictional problems, limit the possible development of extensive surface supplies.

Groundwater sources are needed to supplement surface supplies. Potential aquifers have been mapped. A testing program is needed to measure ground water yield as a source of potable water. The longer such testing is delayed, the greater the likelihood that potential ground water sources will be polluted by new development.

Two of the region's major recreation areas, Lake Lillinonah and Lake Zoar, created by the power dams on the Housatonic, are threatened by pollution, both from sewage system effluent and from on-site septic systems serving homes bordering the lakes. These homes were originally constructed as summer cottages, and most have been converted to year-round use. The adequacy of septic systems is questionable due to soils, slopes, and small lots. Algae infestation, high coliform counts, and unpleasant odors have eliminated swimming and other recreational uses from the northern section of Lake Lillinonah.

Lake Candlewood, the largest inland lake in the state, has experienced the same type of residential development, none of which is served by sewers at the present time.

Additional water recreation facilities are needed and a potential site has been identified. A park has been proposed in the Paugessett State Forest in Newtown but its feasibility has been questioned. Although Lake Candlewood is unequalled as a recreational area for the region, only one state park exists on its shores. The identification of a suitable site for another state park would be of great benefit to the region. Land along the Still River also has recreation potential, as yet unexplored, because of its proximity to the proposed Route 7 Linear Park.

The Still River is the major source of flooding in the region. Although programmed Corps of Engineers projects in Danbury will protect many flood prone areas, streets further north are frequently under water during heavy rains and spring thaws, and open land in several locations is occasionally inundated. Encroachment into the flood plain has aggravated flood problems in certain areas. Localized flooding conditions, often caused by inadequate storm drainage systems, occur along many smaller streams and tributaries.

Litchfield Hills Region

Existing water resource-related problems in the region are in the areas of water pollution, water supply, and flood control. Pollution problems on the Bantam and Naugatuck Rivers result not only from an increasing volume of pollutants but also from secondary treatment plant inadequacies, which are directly related to sewer system problems caused by storm sewer infiltration, illegal domestic linkups, and groundwater infiltration. The Naugatuck and Bantam Rivers, whose headwaters originate within the region, lack sufficient stream low flow volumes

to effectively dilute the polluting effluent. These volumes are further lowered by diversions for domestic and industrial water supply purposes. Although six flood control projects including Thomaston Dam, have greatly reduced the possibility of disastrous floods, small stream flooding annually causes property damage.

Due to increased industrial and domestic water use, storm drain infiltration, illegal sewer linkups, and ground water infiltrations, the Torrington secondary sewage treatment plant often operates well over its design capacity. Direct discharge into the Naugatuck River, compounded by its inadequate low flow volume, causes severe pollution. Although not yet operating at design capacity, the secondary treatment plant at Litchfield, which discharges into the Bantam River, has problems similar to the Torrington plant. A tertiary, land treatment system has been proposed for the Litchfield plant.

Pollution is not confined to waste water receiving streams. Recent tests have revealed high coliform concentrations in Leadmine Brook, the source of which has not yet been determined. The eutrophication of Bantam Lake is destroying its recreational and aesthetic value. The evolutionary process of infilling has been augmented by increased levels of nitrogen and phosphorous caused by agricultural activity and urban development in the watershed. Additional algal nutrients are contained in the minor amounts of raw sewage that enter the lake.

Pollution of streams and groundwater supplies is further aggravated by septic tank failures which are caused by their emplacement in poorly drained, hardpan, or shallow to bedrock soils. More than half the region contains soils with one or more of these conditions.

The nature of future development in the region is heavily dependent on the alternative methods for treating wastewater and providing potable water. Torrington's growth potential is restricted by the Naugatuck River's low flow volume which cannot effectively purify discharged secondary effluent. Areas other than urbanized parts of Torrington, Norfolk, and Litchfield depend almost entirely on bedrock wells for their water supply. Alternatives for augmenting water supply include increasing surface impoundments and developing bedrock and stratified drift sources more fully. In any case, potential water supply areas, both surface and ground, should be protected from pollution.

A problem of great concern is the use of land in the region for water supply reservoirs which serve other regions. In the Town of Harwinton, three reservoirs serving the City of Bristol pre-empt 100% of existing surface water supplies, and plans call for a similar use of potential Harwinton supplies in the future. Most of Waterbury's 17.3 MGD demand is supplied by the Shepaug, Pitch, and Morris Reservoirs, which inundate 390 acres in Litchfield and Morris.

While the possibility of catastrophic floods has been reduced by six flood control projects, flooding damage from smaller streams is an annual problem. Establishment of channel lines, improvement of channels, and floodproofing existing and proposed urban areas are needed along the East Branch of the Naugatuck River and Gulf Stream in Torrington and along the Bantam River. The need for such measures is especially acute at Bantam Lake where water level fluctuations periodically threaten lake shore residences. A possible solution is to rehabilitate the existing dam at the lake outlet. Improvements in flood protection are necessary before residents of Litchfield and Morris can qualify for flood insurance.

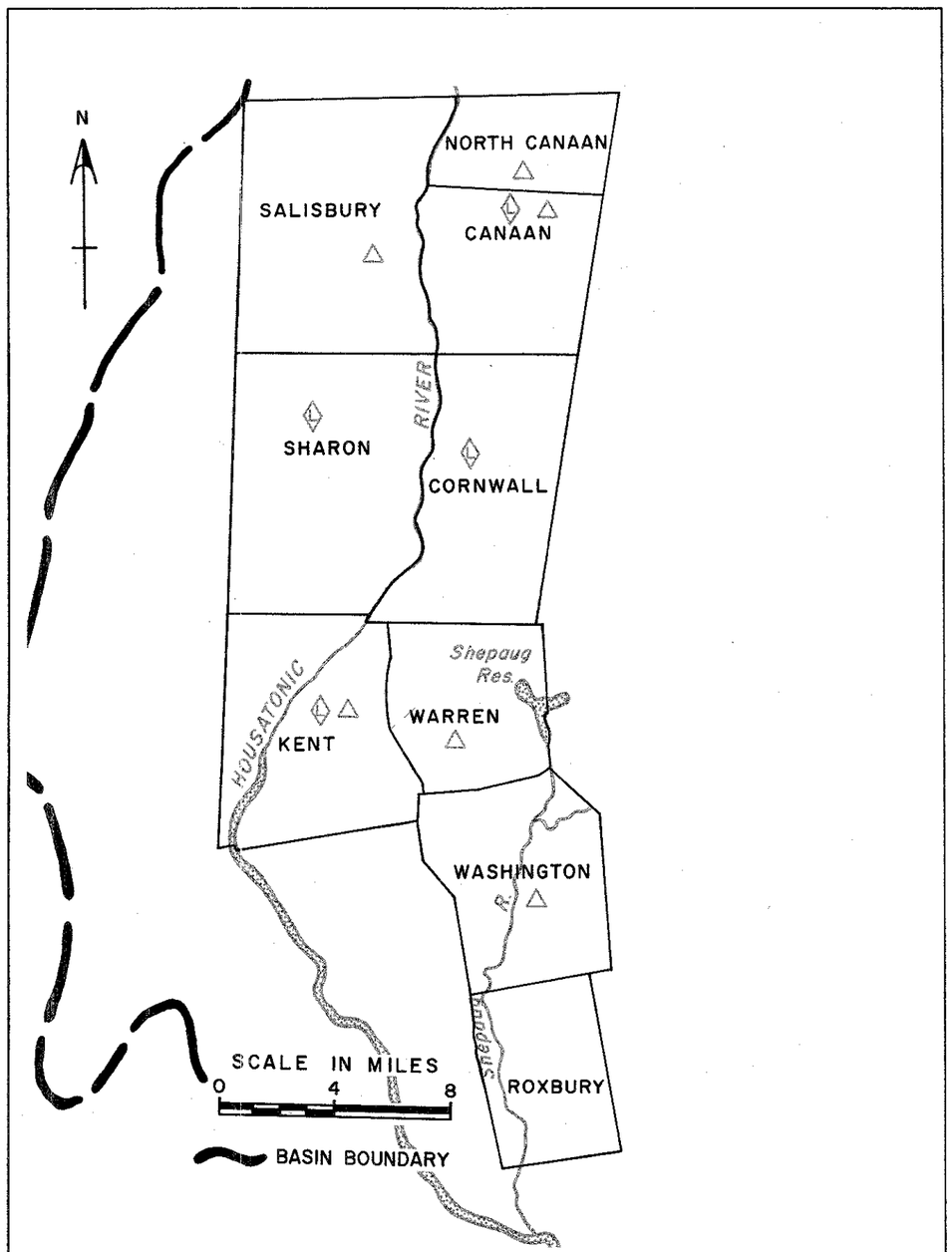
Northwestern Region

While the Northwestern region's water-related problems are less severe than those of other regions in the Study Area, preventive action is necessary to maintain the region's high water quality and to preserve the water and surrounding land resources as scenic and recreational assets. In addition, many streams and rivers flowing through or originating in the region provide downstream areas with water for potable or recreational purposes.

The numerous small village centers have not generated any significant water-related problems although the potential for pollution of surface and ground water exists at some locations if population growth and residential densities increase rapidly. Only a few of these villages - Canaan, Kent, Washington Depot, Lakeville, Salisbury and Sharon - are served by public water and sewage systems. Only Sharon has a system that could significantly expand while the systems serving Lakeville, Salisbury and Canaan have a minor expansion potential.

Year-round and recreational homes clustered around the region's numerous lakes and ponds contribute to water pollution in some cases. However, efforts to control water pollution by restricting recreation-related development could have an adverse effect on an important and expanding element of the region's economy.

Recognizing that the region's rugged terrain severely restricts development with on-site sewage systems, local zoning ordinances prohibit septic systems on much of the region's land. However, local health ordinances are needed to protect critical areas along streams and other water bodies. Protection of land along the Housatonic and Shepaug Rivers has been the subject of intense debate in the region. Development on the narrow flood plain of the Housatonic has been identified as a problem, and the proposal to dam the Shepaug River has met strong opposition. The State's land use plan proposes to preserve the broad scenic ridge along the Housatonic and legislation has been introduced in Congress to control land use along both rivers.



NORTHWESTERN CONNECTICUT REGION

LEGEND

WASTEWATER PROBLEMS

- Stream pollution
- Septic tank failures — T
- Infiltration — I
- Eutrophication
- Storm sewer point pollution sources — S
- Need construction, repair, or extension of sewer lines — R

WATER SUPPLY PROBLEMS

- New supply source needed — N
- Surface water contamination — C

FLOOD CONTROL PROBLEMS

- River flooding
- Bank erosion
- Encroachment into flood plain

LAND USE PROBLEMS

- Deteriorating, congested riverfront
- Reclamation of open pits caused by sand and gravel industries needed — G
- Large tracts of land in public ownership reduce local tax base — L
- Urban development restricted by water supply water shed — U
- Urban development restricted by stream quality limitation — Q

Large tracts of land in the Northwestern region are publicly owned open space and recreational preserves. More than 20% of the land in the towns of Kent and Cornwall are in public ownership. This land is removed from the tax rolls, reducing the amount of taxable land, which increases the burden on local taxpayers in these rural communities with little industry. Policy statements and guidelines are needed regarding further acquisitions of open space.

STATEMENT OF PLANNING OBJECTIVES

A basic purpose of the Urban Studies Program is to incorporate various national, state and regional objectives into a program for future action. Coordination and public involvement efforts thus far have resulted in the articulation of state and regional objectives which are necessary supplements to the national objectives contained in the Urban Studies Procedures, Federal Water Pollution Control Act Amendment of 1972, and the Water Resources Council's Principles and Standards.

National Objectives

The overall purpose of water and land resource planning is to enhance national economic development by increasing the value of the nation's output of goods and services and improving national economic effieiency; and to enhance the quality of the environment by the management, conservation, preservation, restoration, or improvement of the quality of certain natural and cultural resources and ecological systems.

The objective of the Federal Water Pollution Control Act Amendment of 1972 is to restore and maintain the chemical, physical and biological integrity of the nation's waters. In order to achieve this objective, specific goals call for: the elimination of pollutants discharged into navigable waters by 1985; an interim goal of water quality achieved by 1983 which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water; the provision of Federal financial assistance to construct publicly owned waste treatment works; the development and implementation of regional waste treatment management planning processes to assure adequate control of the sources of pollution; and the development of technology necessary to eliminate the discharge of pollutants into navigable waters, water of the contiguous zone, and the oceans.

The objectives of the Urban Studies Program are described under the Program Objectives section.

State Objectives

The state's water and land use policies and objectives are discussed in the Plan of Conservation and Development (Appendix C). Recognizing the hazards of uncontrolled growth, this document designates land use patterns which allow for population growth and economic expansion in a manner that is cognizant of the environmental limitations on development. In order to preserve scenic and undeveloped areas, the Plan of Conservation and Development directs growth to existing urban centers or adjacent areas where the necessary support services such as transportation, water, and sewers can be provided at minimum cost.

The specific objectives outlined in the Plan of Conservation and Development include: establishment and protection of water supply sources sufficient to meet future water supply needs; provision of a wide variety of high quality outdoor recreational opportunities, with the highest priority given to the purchase and development of facilities in and near the state's urban areas; protection of scenic, historic and natural resources from premature, uncontrolled or incompatible development; protection of rivers and lake shores, flood plains and coastline from environmentally destructive alterations and development; directing urban development to those areas identified as Suitable for Urban Development, preferably close to existing urban, commercial and employment centers; encouraging urban development to be at sufficient densities for the economic provision of services; promoting staged, contiguous development within areas Suitable for Urban Development; and encouraging local participation in conservation and development activities.

REGIONAL OBJECTIVES

Central Naugatuck Region

While the General Plan of Regional Development, adopted in 1964, discussed specific goals and programs for the efficient use of water resources, the Central Naugatuck Regional Planning Agency has proposed a number of general goals and objectives as a basis for discussing and formulating a revised General Plan. Overall goals most directly related to water resources include; a desire to improve and conserve the quality of air, water and land in the region; the need for orderly growth and development to help create a desirable physical and social environment; and a need to improve community facilities and the delivery of public services.

Sewage treatment objectives call for the most economic and efficient disposal methods which encourage a maximum preservation of natural resources, including public water supplies, recreation and scenic streams. Protecting all identified or potential ground water and surface water sites, recharge areas, and watersheds, and maintaining the hydrological balance by using and disposing of water as close as possible to its source are stated water supply objectives. Flood control objectives call for the protection of existing development from flood damage and the prevention of new development in flood prone areas, both subject to cost-benefit analysis. Actions upstream from existing or potential development in the region must be enjoined if such practices increase flood hazards. In addition, flood control structures should be used for other purposes wherever consistent with their primary function. Water-related recreation objectives include: the protection of scenic resources in the region from incompatible development; providing a wide variety of water-related recreation to the residents of the region and the State;

and assigning the greatest priority to the purchase and/or development of facilities in or near the urban centers.

Valley Region

Short range objectives for the Valley region emphasize the detection and cleaning up of existing and potential health hazards. Septic tank problems in the Far Mill River watershed immediately threaten the health of residents who depend on ground sources for potable water.

A long term regional objective is to create a sewer/water authority that has jurisdiction over the four towns in the region. Existing institutions administering and regulating these services are fragmented in both the public and private sectors. A short term objective calls for a coordination of the operations of these institutions.

In order to protect water quality, preserve open space, and prevent undue burdens on public services, the status of water company holdings must be evaluated in terms of what their disposition might be if state health regulations require that all potable water be filtered and if pressure to develop these holdings increases. Although towns are given first option to purchase water company lands when they are put up for sale, no town can afford to buy these vast holdings for open space when it must compete with developers.

Older multi-problem riverfront cities like those in the lower Naugatuck Valley have problems common to other cities in the Housatonic basin. Developing the recreational and aesthetic potential of urban rivers requires a unified approach to riverfront zoning, programs for reclaiming undesirable uses on abandoned land, and innovations which provide new uses for public riverfront easements and rights of way.

Housatonic Valley Region

Ensuring adequate public water supplies through a combination of surface and groundwater sources is a primary objective that should be addressed by the Housatonic Urban Study. Data related to surface water sources is sufficient to determine their potential to meet the region's needs. An immediate program to test aquifers is needed in order to generate ground water data necessary to supplement surface source and service area data in the development of a comprehensive water supply plan for the region.

Another objective is to provide sewage collection and treatment to areas with existing and identified future needs at the lowest possible financial, environmental, and social costs. While sewage disposal planning should eliminate problems created by the lack of sewer systems, such plans should minimize the environmental impact of

the installation and use of those systems. These systems should be designed and timed to insure that financial costs, environmental, and social disruptions caused by system construction are as low as possible. Protecting public water supply watersheds and recreation areas, and improving the quality of rivers which accept effluent are related objectives.

Flood control objectives call for the establishment of practices which prevent encroachment into flood plains and reduce conditions that contribute to flooding. Measures necessary to implement these objectives include protecting flood plains from further development, and assisting towns in their efforts to eliminate conditions that contribute to local flooding.

Providing a wide variety of readily accessible, diverse recreational opportunities can be accomplished by encouraging multi-use of water resource areas where feasible, improving the condition of existing facilities, developing new facilities, and reducing travel times by appropriate site location.

Litchfield Hills Region

Short term and long range water-related objectives for this region are concerned with developing or improving sewer, water, and flood control systems.

A top priority, long range objective is the extension of existing sewer systems in Norfolk, Torrington, and Litchfield to provide for ongoing development. Inter-municipal agreements are needed to extend the Litchfield and Torrington systems into the towns of Morris and Harwinton, respectively. These treatment plants should be enlarged as needed and should be converted to tertiary treatment systems as soon as possible. Subject to soil conditions and location in relation to water supply watershed areas, dwelling unit densities necessary to support individual septic tank leach fields must be set to insure water quality adequate for potable purposes. A monitoring system and a continuing education program are needed to insure that on-site systems are properly used, maintained, and improved where necessary.

Short term waste water objectives call for the improvement of the Litchfield and Torrington sewer systems by preventing infiltration and leakages and closing off illegal tie-ins. Further pollution of the Naugatuck and Bantam Rivers, smaller streams, and the continued degradation of Bantam Lake must be prevented. Additional research and experimentation are needed in relation to: tertiary effluent treatment, including spray irrigation; controlling nutrient and sediment pollution, and raising oxygen levels in Bantam Lake; and preventing further depletion of receiving stream low flow volumes. Continuing

studies of the soil-septic tank leach field relationship are needed to develop lot density standards for incorporation into local zoning regulations.

A major long range water supply objective calls for the development of surface and aquifer resources and the creation of a distribution system that integrates water supply systems with overall development plans. In order to implement this proposal, an area-wide, intermunicipal public agency must be established that is capable of designing, constructing, and financing the development of water resources and appropriate distribution systems. More specifically, water supply systems in Norfolk, Torrington, Litchfield, Morris, and Harwinton should be extended. Aquifer protection and development in Norfolk and Litchfield are necessary to provide alternative systems of water supply. Because of the large number of on-site systems in the region, well densities should be standardized to insure re-charge areas sufficient to provide long-term supplies to individual wells.

Short range water supply objectives include: the provision or completion of water distribution system improvements in Norfolk, Torrington, and Litchfield; the protection of existing and potential water supply sites and drainage basins from development. Continuing research and experimentation concerned with tertiary waste treatment through spray irrigation is also a water supply objective since renovated waste water would return to the regional hydrologic system.

Flood control objectives include: protecting existing development along smaller streams from flood damage through channel improvements and the establishment of channel lines; preventing future development in flood prone areas; identifying and initiating efforts to protect streambelt areas; implementing the Inland Wetlands Act; upgrading storm drainage systems in Norfolk, Litchfield and Torrington and disconnecting them from municipal sewer connections; studying the best methods and least disruptive locations for discharging storm sewer effluent; studying the multiple use of flood control dams; and rehabilitating the Bantam Lake dam to control water level fluctuations and periodic flooding.

Northwestern Region

The Northwestern Regional Planning Agency, in existence for only one year, has not yet defined or articulated regional water resource objectives. As an initial phase in the development of objectives, discussions have been held in relation to the Connecticut Plan for Conservation and Development.

CURRENT PLANNING AND RELATED DATA

Introduction

Agencies of government other than the principals in this planning effort have planning activities underway in the Housatonic Basin. It is intended that these programs will be identified as part of the initial coordination effort. An excellent bibliography of documents up to 1970 is contained in "Selected Regional, State and Other Governmental Agency Water Resources Planning Documents" of the Connecticut Water Resources Planning Project. This bibliography has been consulted and is being updated in the form of a study document.

Federal

Interagency

The North Atlantic Regional Water Resources (NAR) Study is one of 20 regional comprehensive water and related land resources studies being conducted throughout the United States under guidelines established by the Water Resources Council. The NAR Study was authorized by the 1965 Flood Control Act (Section 208, Public Law 89-298).

The NAR Study Area includes the Housatonic River Basin with "Area 10 - Thames and Housatonic River Basin". The information and data for this area also includes the Connecticut coastal drainage system. More often than is desirable, the information and data on the Housatonic River is not separable from the data for the area as a whole. This necessitates review of background information and interpolation of published data to provide specifics on the Housatonic River Basin.

Corps of Engineers, North Atlantic Division

The Northeastern United States Water Supply (NEWS) Study was authorized under Public Law 89-298. It directed the Secretary of the Army, acting through the Chief of Engineers, to cooperate with Federal, State and local agencies in preparing plans to meet the long range water needs of the Northeastern United States.

The NEWS study area includes the Housatonic River Basin, but in depth studies have included only that which lies within the Western-Connecticut portion of the New York Metropolitan area and its service area (including all of Fairfield and New Haven Counties).

Corps of Engineers, New England Division

The Housatonic Basin is within the geographical jurisdiction of the New England Division. Flood control projects on the Still and Naugatuck Rivers and a flood plain information study for the Naugatuck River have been com-

pleted. A flood plain information study is underway for New Milford, Connecticut.

Environmental Protection Agency

A Storm Water - Water Quality Model is being developed in the Housatonic Basin in Connecticut for EPA by Raytheon Systems. It is scheduled to be completed by the middle of 1974.

Department of Interior

The U.S. Geological Survey has initiated groundwater studies in the Naugatuck Valley area to estimate long-term water supply yields. Earlier preliminary groundwater studies of a reconnaissance nature have been completed for the Housatonic Basin in Connecticut and the reports are on file.

Interstate

New England River Basins Commission

A regional (level B) study of the Long Island Sound region is being conducted under the general direction of the New England River Basins Commission and a Federal-State study management team.

In Connecticut, the study area includes the one to four tiers of towns encompassed by the five coastal regional planning agencies. Therefore, that portion of the Housatonic River Basin which lies within the Greater Bridgeport and the South Central Connecticut Regional Planning Agencies is included.

The study consists of these phases: (1) an inventory analysis of existing data and previous reports on the study area, (2) the development of plans and alternative plans for each of the many uses of the area resources, and (3) the blending of these plans into comprehensive recommendations for the years 1990 and 2020.

Initiated in January 1971, the study is scheduled for completion in mid 1974.

Tri-State Regional Planning Commission

This commission conducts inventories and studies of the tri-state region as a whole. It is currently involved with such tasks as mapping the areas sewered, the water supply service areas and the sources of water supply.

State of Connecticut

The current planning programs for the State of Connecticut are presented by water resource functional area.

Wastewater Management

Municipal facilities planning, accomplished by the municipality and reviewed by the state, is carried out pursuant to Section 201 of Public Law 92-500. Major review elements include consistency with state and regional plans, cost-effectiveness and environmental factors. After such a review is completed, construction plans and specifications commence. It is estimated that 26 such plans will have been submitted and reviewed in FY 74.

Areawide waste treatment management planning under Section 208 of PL 92-500 provides for the establishment of regional agencies to carry out 100% federally funded planning for areas which have been designated as priority water quality problem locations by the Governor. In March 1974 the Governor recommended that the entire state be non-designated, which preserved his option to make future designations under the Act. It is intended by the state's Department of Environmental Protection to recommend designation of regional planning agencies to the maximum extent possible.

Section 303(e) basin planning requires the development of detailed stream quality information to quantify water quality problems, the construction of mathematical river basin simulations, the application of such simulations to define alternative solutions to water quality problems, and the final alternative selection, based on cost, environmental, social, and other factors. To the extent practicable, output from such plans will provide a framework for municipal facilities planning and permit conditions. At present, such simulations are under development for the Housatonic River, a portion of the Naugatuck River and the Still River.

Water Supply

The State of Connecticut has formulated feasibility scope plans for developing a number of water supply sources in the Housatonic Basin to be implemented as the need becomes necessary. Alternative sources of supply were considered and narrowed down to the present number of recommendations. These recommendations were formulated within the Plan of Conservation and Development and in Phases I, II and III of the Connecticut Water Resources Planning Project. The recommendations were developed based on state law and the State Public Health Code restricting waste receiving streams from use as water supply sources. The cost estimating work on these recommendations is limited in most cases.

These recommendations consist of 91 key sites of water supply located throughout the state with a total estimated safe yield of 310 MGD considered adequate to supply a projected total population of 4.9 million anticipated around the year 2000. Twenty-five of these sites are located in the Housatonic Basin and 4 are considered to be needed in the near future (priority).

Flood Control and Flood Plain Management

The most serious flooding threats in the Housatonic Basin have been alleviated by Corps' flood control reservoirs and local structural protection particularly along the Naugatuck and Still Rivers. Problems of delineating the flood plain and then regulating its development remain. Some flood plain delineation work has been accomplished through the Corps' Flood Plain Information Program,HUD's Flood Insurance Program, SCS's Streambelt Projects, the state's Channel Encroachment Line Program and the Municipal Channel Encroachment Line Program. While flood plain regulation can be enforced through the state's Channel Encroachment Line Program, this method of delineation is quite expensive. Consequently, the problem of enforcing flood plain regulation remains.

Navigation

There are few navigation problems on the Housatonic River and any problems that do exist are addressed in NERBC's Long Island Sound Study and by the state's Coastal Zone Management Program.

Water Related Recreation

Water related recreation is addressed by the Statewide Comprehensive Outdoor Recreation Plan (SCORP), the state's proposed Plan of Conservation and Development, and respective regional land-use plans which have established the need and have presented programs and projects to meet these needs.

Regional Planning Agencies

Central Connecticut

In 1969, the Central Connecticut RPA produced plans for water supply, water pollution control and flood control in three separate reports.

Central Naugatuck Valley

The most pertinent existing reports of this RPA are the "Water Supply Study and Plan", the "Sewage Disposal Study and Plan" and the "Storm Drainage: Present and Future Needs", all completed in 1969. The final phase, selection of alternatives and costing, of the Sewer and Water studies was not completed in 1969. It is anticipated that this will be done following the consolidating of the overall regional goals, objectives and policies in the revised plan, where choices as to the degree of growth desired and its form will be made.

The individual municipalities, with the exception of Bethlehem, Southbury and Woodbury, have local sewer studies. Oxford's is currently in preparation. Middlebury has commissioned and received a water supply study.

Greater Bridgeport

Current planning activities of the Greater Bridgeport RPA stress open space and conservation, solid waste disposal, housing and transportation. Their bibliography lists entries from 1961 to 1971, an important document of which is the "Regional Plan for Sewerage, Drainage and Water Supply - 1970".

Housatonic Valley Council of Elected Officials

A current major planning effort of the Housatonic Valley RPA is in the water supply area with other thrusts in housing and transportation. Publications run from 1971 to 1974, the most pertinent being the "Wastewater Management Study, Phase One - 1972".

Litchfield Hills

Major planning activities are in the areas of solid waste management, development of public utilities, economic development and education.

The bibliography lists relevant documents contained in the L.H.R.P.A. library. Of specific importance is the Sewer, Water and Drainage Plan of the Litchfield Hills Region (1973). This report needs further detailing of alternative courses of action and cost analyses.

Local sewer studies exist for Norfolk, Litchfield and Torrington. The Regional Plan exists in preliminary form. Work is continuing toward its final formulation.

Of special relevance to the Litchfield Hills Region are studies by the Connecticut Agricultural Experiment Station, New Haven, on area soil limitations for on-site sewage disposal systems and for spray irrigation systems. Also, the Army Corps of Engineers, New England Division, made studies on Bantam Lake which were published.

Northwestern Connecticut

Major planning efforts recently either completed or underway, include town plans for North Canaan, Kent, Warren, Washington and Roxbury. Cornwall is anticipating a town plan update. All but one town (North Canaan) is zoned, all with basic, but not elaborate, regulations. Subdivision regulations in the region may not be adequate for environmentally protective land use control measures in the face of a large development proposal. The newly instituted inland-wetlands law has undoubtedly the most direct implication for the long range health of area water resources. Presently eight of the nine towns in the region have taken the initial step toward implementation of this act.

South Central Connecticut

This RPA is highly developed and is currently active in activities

in most planning areas. The bibliography contains reports from 1947 to 1972. A pertinent report is "An Action Program, Clean Water for the Region - 1971".

Valley

Current planning activities of the Valley RPA stress solid waste management, sewerage facilities operation and waste management in addition to activities in most other common planning areas. The bibliography lists publications from 1966 to 1971 the most pertinent being the "Recommended Regional Plan for Sewerage, Water Supply and Storm Drainage". Water quality problems are discussed in "The Valley Tomorrow", the regional plan, which is scheduled for public hearings in the near future.

PUBLIC INVOLVEMENT PROGRAM

GENERAL WORK TASKS	OBJECTIVES	DESIRED PRODUCTS	SPECIFIC WORK TASKS
I. Identification of Publics	. Identify influential individuals and groups	. Categorization of publics . Mailing list	. List development . Identify media . Develop ad hoc committees
II. Education and Information	. Educate public about water resources to improve inputs to the study . Establish credibility of the study . Insure government agency coordination	. Educational materials . On going series of seminars and workshops . Public meetings	. Develop brochure and newsletter . Mail public notice . Conduct seminars and workshops . Hold public meetings . Periodic press releases
III. Planning Inputs			
A. Needs Identification and Data Collection	. Determine regional and local needs . Determine regional and local objectives	. Delineation of problems and statement of priorities . List of regional and local objectives	. Meet with various groups in the management system, including ad hoc advisory committees
B. Formulation of Alternatives	. Include publics in formulation of plans directly affecting them . Insure that alternatives are politically feasible	. Alternative water resource plans that reflect inputs from publics	. Conduct seminars and workshops . Analyze feedback from seminars, workshops and public meetings
C. Impact Assessment	. Utilize expertise of informed publics in development of profiles and indicators	. Regional profile and indicators . Analysis of plans according to beneficial,adverse impacts	
D. Evaluation	. Ascribe public preferences to alternative plans . Resolve conflicts between groups . Insure that plans meet objectives	. Articulate and display public preferences . Rank alternative plans according to public preferences . Select most workable plans based on technical, political, financial, and implementation criteria	

PUBLIC INVOLVEMENT STRATEGY

For purposes of the management of the study, the involvement of the public - which is defined as any non-Corps entity - has been divided into a public involvement program and an agency coordination program. The former includes the general public, while the latter involves government agencies and elected officials. The objective of both programs is to provide structured opportunities for communication and participation in the planning process.

Public Involvement Program

The basic structure of this program consists of techniques for continuing communication with an emphasis on information and education, and periodic participatory events associated with each of the major phases of the planning process. Continuing communication techniques include press releases, newsletters, speeches and exhibits, while the participatory events involve public meetings, seminars and workshops. The specific objectives and techniques are portrayed in the inclosed Public Involvement Program table.

The major participants in the study - the Corps of Engineers (North Atlantic and New England Divisions), the Connecticut Interagency Water Resources Planning Board, and the five Regional Planning Agencies in the study area - are responsible for coordinating the public involvement program. The development and publication of a quarterly newsletter is the responsibility of the Corps, in consultation with the management groups. The newsletter will serve as a major information and education mechanism of the study management. Newsletters published by groups within the basin, including the RPA's and special interest groups, will provide a mechanism for their advocacy and adversary roles.

While the continuing communication techniques, such as the newsletter, present a basin-wide overview of the study, the participatory events, including public meetings, workshops, and seminars,represent a regional approach to public involvement. Funds have been programmed to each of the five RPA's for the purpose of conducting public meetings, workshops and seminars in their respective RPA's. These participatory events will occur periodically throughout the study, with a maximum of one meeting in each of the 5 regions during each stage of the study.

Coordination Program

Sound, efficient study management and conduct requires full coordination with interested agencies as well as the participation of agencies having appropriate expertise, when such agencies also have the capability and willingness to perform. Thus, active participation in the form of advice and assistance, as distinct from routine coordination, will be sought from other agencies.

To assure effective interagency coordination and participation, a matrix style checklist has been prepared. It contains the names of those agencies with whom the study management should coordinate, and a schedule relating coordination events to specific studyphases or milestones. A master checklist is maintained by the study manager and will be used to record accomplishment of the required coordination or participation.

The listed agencies have been entered upon the master mailing list and have been categorized and identified for purposes of selected retrieval. This mailing list is a computerized program containing data pertinent to the public involvement program, respondents to advertised contracts,etc. The computer program is located at and maintained by, the New England Division.

The checklist events during which coordination will be accomplished, have been derived from the phases and events depicted on the study schedule. Note that these represent a minimum required level, based on anticipated events.

Prior to final approval of the plan of study, meetings will be scheduled with those state and Federal agencies not included in the development of the plan to coordinate the study with their respective plans and programs.

PUBLIC INVOLVEMENT SCHEDULE

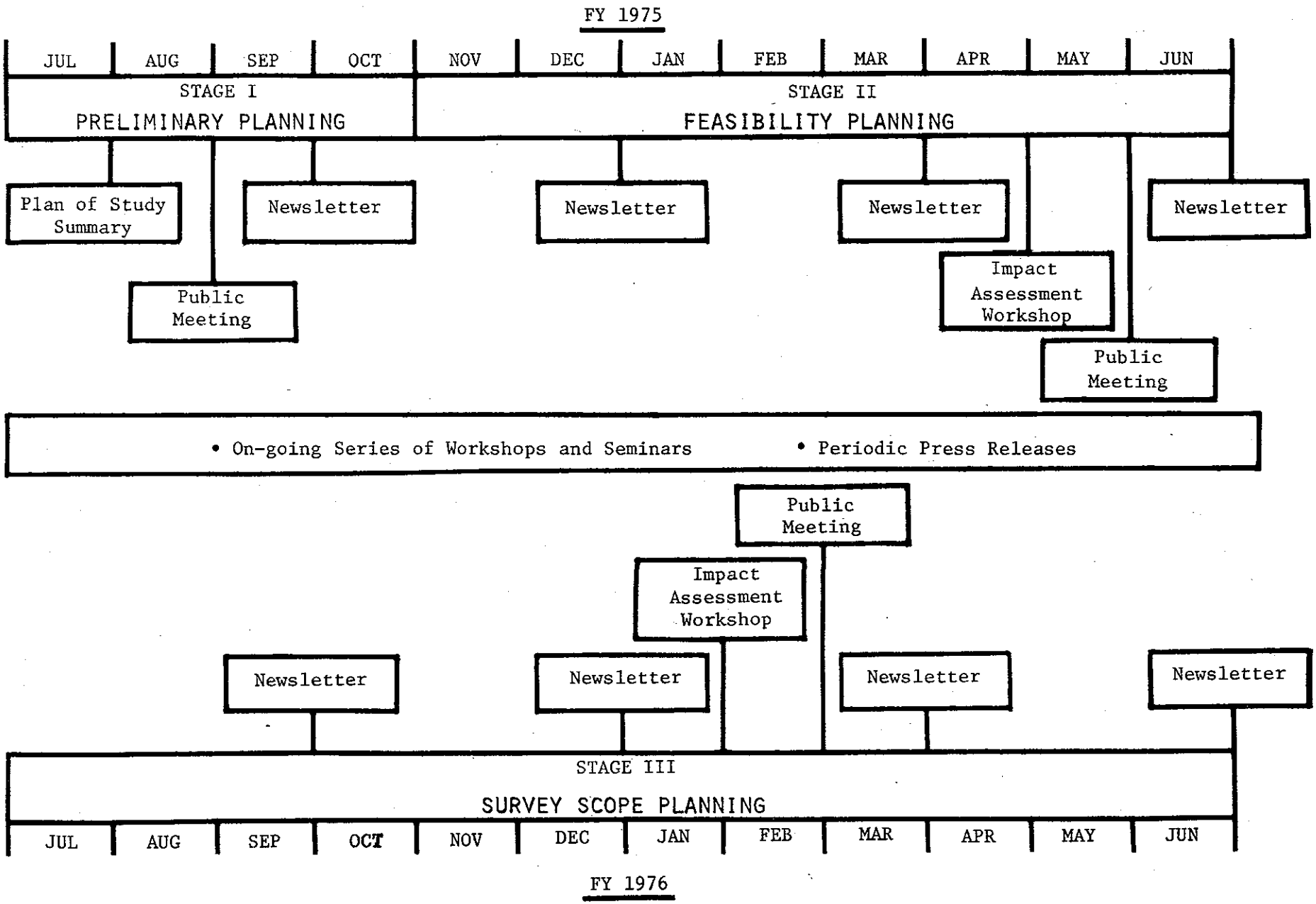


Plate 2-8

INSTITUTIONAL ARRANGEMENTS

The water resources alternatives developed by an urban study must be implementable. Consequently, an assessment of the capabilities of existing institutions to implement the alternatives and a development of modifications to the existing institutional arrangements to accomplish the implementation will be undertaken as part of this urban study. The following paragraphs present a basic framework and starting point for further study.

Description of Existing Institutions

Interstate

The New England River Basins Commission was established under the provisions of the Federal Water Resources Planning Act and is intended to coordinate the planning of water and related resource activities of the different levels of government within the New England area. Under the Water Resources Planning Act, NERBC is directed to (1) coordinate federal, state, interstate, local and inter-governmental planning for water and related land resources; (2) prepare and keep current a coordinated joint plan for development of water and related land resources; (3) recommend long-range schedules of priorities for individual projects; and (4) make studies of water and related land problems within the basin. NERBC has no operational powers (regulatory, construction, etc) that a compact might have, as its main functions are planning and liaison.

The New England Interstate Water Pollution Control Commission (NEIWPCC) was established by an interstate compact adopted by the Commonwealth of Massachusetts and the states of Connecticut, Rhode Island, New York, Vermont, New Hampshire and Maine between 1947 and 1955. The area of jurisdiction of the Commission includes all interstate waters of signatory states and tidal waters ebbing and flowing past the boundaries of any two signatory states. The waters under the jurisdiction of the Interstate Sanitation Commission (New York, New Jersey, and Connecticut) are excluded.

The Commission consists of five Commissioners from each signatory state. The purposes of the Commission include the establishment of water quality standards for various classifications of use in the water bodies under its jurisdiction and the formulation of programs to meet established standards. In accomplishing its purpose, the Commission is acting as an action agency with abatement and control of pollution as its primary function. The Commission works very closely with the pollution control agencies of each of its member states in carrying out its purpose. Any comprehensive planning function would be undertaken by the New England River Basins Commission with the NEIWPCC advising on matters concerning the quality of water.

The New England Governors' Conference is an independent affiliate of the National Governors' Conference which meets periodically to discuss problems of regional significance.

The New England Regional Commission was established under authority of the Federal Public Works and Economic Development Act of 1965. The Commission has a joint membership of the six New England governors and a federal co-chairman. NERC's juridiction includes economic planning and development in general. The Commission is directed to initiate and coordinate the preparation of long-range overall economic development programs, promote increased private investment, and provide a forum for the consideration of problems of the region.

State of Connecticut

Responsibility for water resources is vested in three state departments, one regulatory commission and one interagency board. The responsibility for enforcement of various statutes rests primarily with the Departments of Health and Environmental Protection.

The Department of Environmental Protection has statutory control over pollution and the allocation of federal funds for sewerage facilities Water supply responsibilities include interstate transfers of water. This department is also concerned with the inspection of dams and marinas, flood control work, the establishment of channel encroachment lines and the control of dredging activities.

The Department of Health is responsible for the public health aspects of new sources for water supply as well as the inspection of existing water supply sources.

The Planning Section of the Planning and Budgeting Division within the Department of Finance and Control is concerned with land use and related areas and has the responsibility for the preparation of plans for water resource development.

The Public Utilities Commission regulates rate schedules and the operations of private water supply purveyers, but has little to do with planning.

The Interagency Water Resources Planning Board consists of representatives from the Departments of Environmental Protection, Health, and Finance and Control (Planning and Budgeting Division). Its basic responsibility is to prepare jointly a Statewide Long-Range Plan for the management of the water resources of the state and other related responsibilities as directed by state law. Further, it is directed to establish a continuing planning process and to prepare and periodically update the water resource management plan.

The work of these tasks has been conducted by a technical board made up of a limited number of technical staff of the three participant agencies working part time on IWRPB assigned tasks. This work has been undertaken in close coordination with statewide land use planning activities of the Planning and Budgeting Division. Water resource issues have been identified and policies have been recommended, supplemented by technical studies of water supply, water based recreation and wastewater. The board is presently preparing the first phase of a recommended statewide long-range water resources management plan and developing a program for a continuing water resources management planning process.

Regional/Local

The State of Connecticut has replaced county governments with 15 regional planning agencies (RPA's). Eight of these RPA's are wholly or partially within the basin. Those RPA's which are predominently within the basin are the Northwestern, Litchfield Hills, Central Naugatuck Valley, Housatonic Valley, and the Valley RPA's. Those RPA's of which only a small part is within the basin are South Central, Greater Bridgeport and Central.

State law prescribes that a regional planning agency may be formed by ordinance of the legislative bodies of two or more towns within a defined region. Each town is entitled to two representatives and possibly more, depending on its population. At least one representative should be from a town's planning commission and the other should be elected or appointed as provided by the town's ordinance. These agencies have the responsibility to prepare regional plans of development and to help the member municipalities to carry out these plans. Further, they are responsible for establishing regional goals and objectives. The functions of the RPA's are of a planning and advisory nature; regulatory and program implementation powers rest with the constituent municipalities.

Other important regional bodies in the Houstonic basin are the Central Naugatuck Valley Council of Governments, which is related organizationally and staff-wise to the RPA and is comprised of the chief elected official of each of the 13 municipalities in the CNV region, the Housatonic Valley Council of Elected Officials, which was authorized by the state to act as the RPA for the Housatonic Valley Region, and the Council of Elected Officials of the Valley RPA area.

Also of a regional nature are the water and lake authorities, most notably the Lake Lillinonah, Zoar and Bantam Lake authorities and the Pomperaug Valley Water Authority. These authorities are formed by individual town ordinances usually spurred by a specific reason such as improving water quality.

Other public local bodies which must be considered in an institutional analysis are the local towns themselves where the actual operational powers rest. Within these towns are the local planning and zoning and the water and sewer commissions.

Private investor owned water companies are usually important in Connecticut, serving 52% of the population. Private companies have little control over land uses in their watersheds and there is concern in the Housatonic basin because of increasing financial pressure on the companies to dispose of watershed land. Regional authorities may be needed to fill a coordinating role.

Private insitutions concerned with water resources in the Housatonic basin which could have an impact on water-related resource development include the Housatonic Valley Association and the Berkshire-Litchfield Environmental Council.

Legal, Institutional and Cost-sharing Analysis Program Outline

Data Collection

This stage will begin during the preliminary planning phase of the overall urban study. It will include the identification of the agencies and institutions affecting the study area. Before the actual data about those agencies is collected, the possible sources of data and the techniques for its collection will be identified.

Data Analysis

While the technical alternatives are being developed, the data collected in the previous stage will be analyzed to provide an understanding of the institutional structures within the basin. Special emphasis will be placed on the critical factors for implementing the water resources plans. A report discussing the critical factors and the institutions in general will be prepared. The detail of this analysis depends on the detail of the technical alternatives. Each iteration will require a more detailed data analysis.

Impact Analysis

Part of the impact assessment and evaluation of the technical plans will include an analysis of the extent to which the existing institutions can implement each of the alternatives. The institutional requirements of each alternative must be determined and the ability of each institution to respond must be assessed. A report will be prepared to provide input for the next stage of iteration in

the development of alternative plans.

Final Institutional Alternatives

This stage is part of the survey scope planning phase. It is required that at least two implementation programs be developed for each plan; however, the institutional arrangements may be the same for each program. In this stage, the institutional arrangements will be designed and the implementation plans prepared, based on an identification of the gaps between the institutional capabilities and the requirements of the plans.

STUDY MANAGEMENT

The authorizing resolutions state that the administration and management of this study is the responsibility of the Secretary of the Army, acting through the Chief of Engineers, in cooperation with the State of Connecticut, the Environmental Protection Agency, and, where appropriate, local agencies with planning responsibilies. The responsibilities of the Chief of Engineers shall be exercised through the management role of the North Atlantic and New England Divisions, while the responsibilities of the State of Connecticut will be met through the participation of the Interagency Water Resources Planning Board, which is chaired by the Governor's Coordinator, and by the Commissioners and staff of the member departments of the Board. Local planning responsibilities, which rest with the towns and Regional Planning Agencies, will be served through the participation of Regional Councils of Elected Officials, and Regional Planning Commisions and Directors.

The Environmental Protection Agency which derives its study responsibilities from the resolutions and the administration of PL 92-500 (Federal Water Pollution Control Act) shall assist in planning through advisory roles, and shall review and approve the wastewater plans and programs devised by the study.

Each of the responsible parties and the basin public have been included in a management system consisting basically of four groups. The responsibilities and composition of the groups are set forth in the following narrative and graphic display:

Objectives

The objectives of the study management system of the Housatonic Urban Study are as follows:

1. To encourage public involvement in the study.
2. To identify the responsibilities and functions of the group.
3. To utilize existing governmental infrastructure and preserve and enhance existing democratic processes.
4. To promote intergovernmental coordination.

Groups and Functions

A flexible structure with well defined functions is needed to meet these objectives. The structure devised consists of four groups: executive, policy, operational and advisory. The interrelationships of these groups is illustrated in the following plate.

The Executive Group consists of the Governor of the State of Connecticut and the Division Engineer of the North Atlantic Division of the Corps of Engineers. The functions of this group are the following:

1. Approve major decisions and policies made by the Policy Group.
2. Approve cost sharing decisions.
3. Approve selection of the most feasible alternative plans.
4. Carry out the responsibilities of PL 89-298 (Northeastern United States Water Supply), PL 92-500 (Federal Water Pollution Control Act Amendments), and the Resolutions authorizing this study.

The Policy Group is made up of the Commissioners of the State of Connecticut Departments of Finance and Control, Environmental Protection and Health; the Chief of the Planning Division of the North Atlantic Division of the Corps of Engineers; the Chairmen of the Regional Councils of Elected Officials; and the Chairmen of the Regional Planning Commissions. This group will perform the following functions:

1. Make policy decisions as per their organization's areas of responsibility.
2. Monitor the activities of the Operational Group.
3. Coordinate their respective agency policies and programs with the Urban Study.

The Operational Group consists of the Interagency Water Resources Planning Board of the State of Connecticut, the Special Studies Branch of the North Atlantic Division of the Corps of Engineers, the Regional Planning Agency Directors of the areas within the Housatonic Basin, and Citizen Representatives. The functions of this group are to:

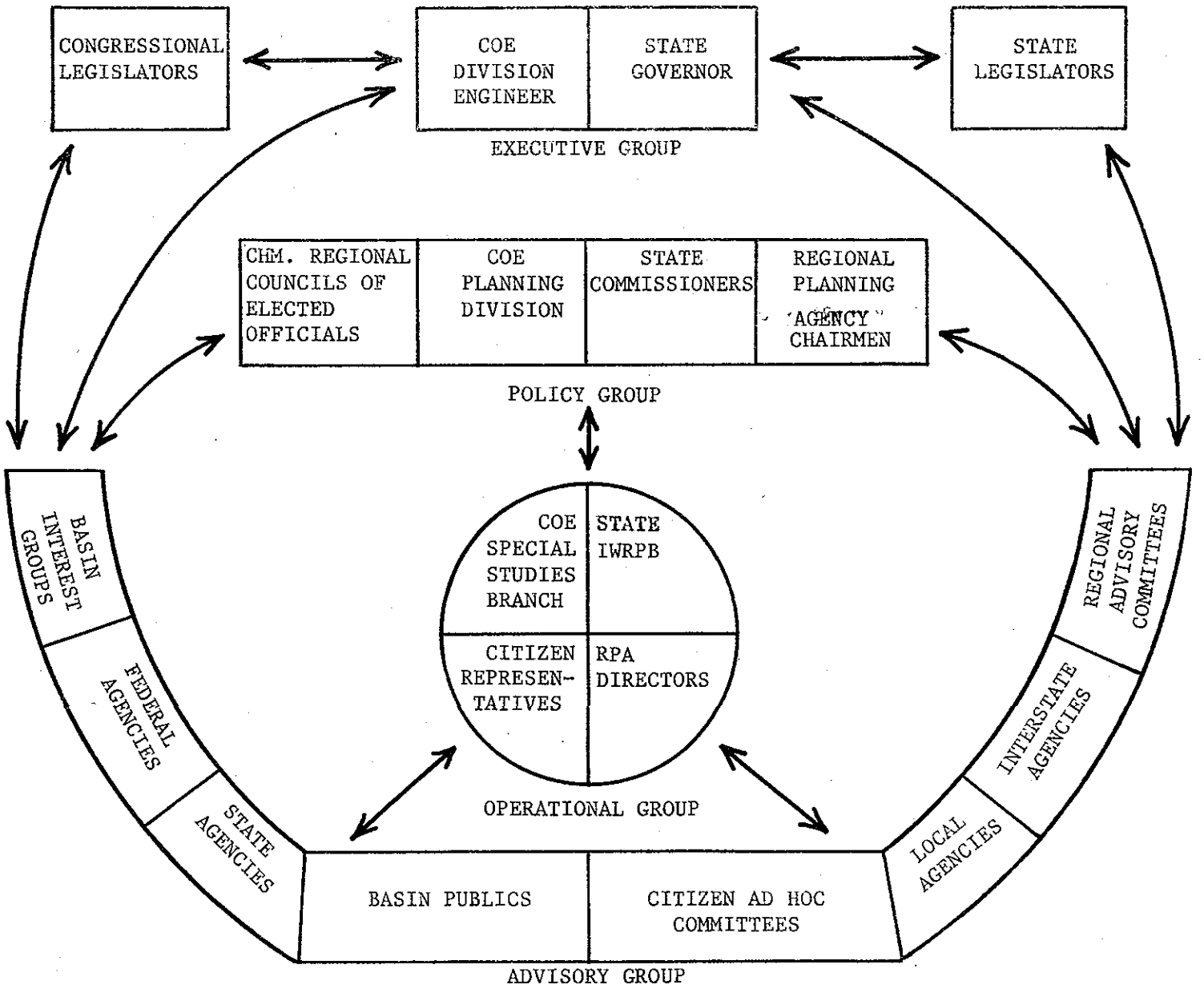
1. Meet periodically to monitor progress, reassess schedules and establish priorities.
2. Prepare scopes of work and monitor consultant services.
3. Designate study team representatives.
4. Designate ad hoc committee chairmen.
5. Participate in the public involvement program.

The large number of members of this group may prove too cumbersome at times to perform certain aspects of these functions. For these aspects, a team of five members will be designated, one from each of the four agencies and one representative selected by the citizens' groups.

The Advisory Group will provide technical and non-technical inputs to the study and participate in public involvement activities. The group includes Federal, Interstate, state and local agencies, Regional Advisory Committees, Basin Interest Groups and Ad Hoc Committees. The Ad Hoc Committees are made up of interested publics and are formed to aid in the identification and evaluation of impacts. The function of the Advisory Group is to:

1. Serve as advisors on programs and major work items.
2. Prepare periodic reports and presentations.
3. Participate in public involvement activities.
4. Assist in developing scopes of work and monitor consultant efforts.

As indicated in the illustration, the public in the Advisory Group has access to all three other groups. They have direct access to the Operational Group, they can consult with the Policy Group through the local elected officials and the local appointed commissioners, and they can reach the Executive Group directly or through their Congressional and State Legislators.



HOUSATONIC URBAN STUDY - MANAGEMENT

Plate 2-9

SECTION III

STUDY EFFORT ALLOCATION

Major Work Items

Scheduling of Work Tasks

Study Costs

Wastewater Management

The State of Connecticut is currently addressing wastewater management pursuant to Public Law 92-500, the Federal Water Pollution Control Act, as amended. In accordance with Section 303(e) of Public Law 92-500, basin planning, the state is developing detailed stream quality information to be used to quantify water quality problems. In addition, a mathematical water quality model for the Housatonic River and its tributaries, the Naugatuck and the Still Rivers, is currently being developed by EPA for use by the state. The state also reviews facilities plans developed by the municipalities under Section 201.

Pursuant to areawide waste treatment planning under Section 208 of Public Law 92-500, the state has non-designated the entire state. The state eventually intends to designate Section 208 planning agencies composed of state and regional planning agency personnel.

The Housatonic Urban Study will use the state's planning procedures and the existing and proposed wastewater management facilities as a basis for further planning. In accordance with the Urban Studies Guidelines, the study will develop wastewater management alternatives to meet both short term (20 year) and long term (50 year) needs. The alternative plans developed will include biological treatment systems, physical-chemical treatment systems and land disposal. In some cases, all three types may be integrated in one alternative.

The development of the alternative wastewater management plans will consider the following areas in detail:

1. municipal and industrial pollution sources;
2. sewer system infiltration - inflow problems;
3. septic tank performance;
4. storm sewer pollution sources;
5. non-point pollution sources;
6. nutrient problems (eutrophication).

The latter three areas, storm sewer and non-point pollution sources and nutrient problems, will be addressed in conjunction with EPA's water quality model mentioned earlier.

Water Supply

The State of Connecticut has developed a set of recommended water supply plans based on their 1970 population projections indicating a need for water supply for 4.9 million people by the year 2000. These plans consist of 91 water supply sites of which 10 are priority sites that will be needed in the near future.

The recommended plans were developed to a feasibility level (in most cases without cost estimates) through the Statewide Long-Range Plan for the Management of the Water Resources of Connecticut, completed in three phases, and are presented in the state's proposed Plan of Conservation and Development.

Based on the present status of the state's recommended water supply plans, the outline of the water supply tasks for the Housatonic Urban Study are as follows:

1. Develop cost estimates for the recommended water supply plans;

2. Perform environmental and socio-economic impact assessments and evaluations of recommended plans;

3. Do survey scope planning for water supply sites including borings, geology, flow records and hydrology;

4. Devise an implementation program including schedules, priorities and flexibility-reliability analyses.

5. Perform legal, institutional and cost-sharing studies.

Further, the Urban Study will address the following areas of a more research oriented nature:

1. Develop a monitoring system to analyze changes in groundwater quality;

2. Perform an analysis of a basin to determine the density of development that could be allowed by subsurface disposal so as not to impair the quality of water for water supply. This analysis will include a definition of the types and magnitudes of contaminants that could be expected from various land uses.

Flood Control and Flood Plain Management

The Housatonic River Basin has relatively few major flood control problems primarily due to the extensive flood control program of the Corps of Engineers on the Naugatuck River - the location of serious flood problems in the past. Additional problems have been reported and these will be investigated.

Table 3-1

WATER SUPPLY SITES UNDER CONSIDERATION
(A Plan of Conservation and Development for Connecticut)

TOWN	Expansion of Existing Reservoirs	Diversions	Groundwater Development	New Reservoirs
Bethany	Hopp Brook	-	-	-
Bethel	-	-	-	Wolfpit Brook
Bridgewater/ Southbury	-	Shepaug River	-	-
Danbury	-	Corner Pond	1 site	-
Derby	-	-	1 site	-
Goshen	-	1)Jakes Brook 2)Mountain Brook	-	-
Harwinton	-	-	-	Cook Dam - E. Branch Leadmine Brook
Kent	-	-	1 site	-
Litchfield	-	-	1 site	Bantam River
New Fairfield	-	-	-	Short Woods Brook
New Milford	-	-	1 site	W.Aspetuck River
Newtown	-	-	1 site	-
Norfolk	-	Brown Brook	-	-
Oxford	-	-	-	Little River
Roxbury	-	-	-	Shepaug River*
Thomaston	-	-	3 sites	-
Torrington	Nickle Mine Brook	-	-	-
Woodbury	-	-	-	1)Weekeepeemee River 2)Sprain Brook 3)Nonewaug River

* long-range possibility

The major tasks remaining are the delineation and the regulation of further development in the flood plains. The Department of Housing and Urban Development (HUD), the Soils Conservation Service (SCS), the Corps of Engineers and the state itself have programs to accomplish some aspects of the above tasks. But much remains to be done.

The flood control and flood plain management work tasks for the Housatonic Urban Study are as follows:

1. Investigate the flood problem areas designated by the state in New Milford, Kent, Southbury and Woodbury and the flood problem areas indicated by the Regional Planning Agencies on the Still River in Danbury below the local protection project, the Gulf Stream in Torrington, and East Branch of the Naugatauck and at Bantam Lake;

2. Develop survey scope solutions to the flooding problems if warranted by "1" above. (not anticipated);

3. Coordinate with HUD as to further flood plain delineation work particularly as to HUD's schedule for future comprehensive flood insurance studies through their regular program. Complete flood plain delineation work in New Milford, Kent, Woodbury and Southbury if HUD is not scheduled to undertake comparable work in the near future. Regardless of which agency actually does the work, schedules and priorities for the regulation of the flood plains in the basin should be completed;

4. Conduct erosion studies on the Pomperaug River in coordination with SCS;

5. Perform legal, institutional and cost-sharing analysis of the mechanisms to implement flood plain regulation;

6. Assist the state and local governments to implement flood plain regulation on a pilot basis.

Water Related Recreation

The State of Connecticut has completed extensive planning in water related recreation. Therefore, the Housatonic Urban Study will not address this area as a major work item. The state's plans were developed in the Statewide Comprehensive Outdoor Recreation Plan (SCORP), the state's proposed Plan of Conservation and Development, and the respective regional land-use plans. Together, these plans assess the recreation needs and present projects and programs to meet these needs. The Housatonic Urban Study will address water related recreation through the multiple-objective planning approach as it relates to the major work items.

Conservation of Fish and Wildlife Resources

The Housatonic Urban Study will not consider the conservation of fish and wildlife resources as a major work item. Sufficient programs are underway particularly through the state's Board of Fisheries and Game. Therefore, fish and wildlife resources conservation will be considered only in the context of multiple-objective planning as it relates to the major work items.

Navigation

The Housatonic Urban Study will not address navigation as a major work item. The navigable portion of the river has been included in the New England River Basins Commission's Long Island Sound Study, and further consideration will be included in the State's Coastal Zone Management Program. Consequently, navigation will be considered only in the context of multiple-objective planning as it relates to the major work items.

HOUSATONIC BASIN
PROBLEMS AND PROGRAMS

PROBLEMS		PROGRAMS	
Type of Problem	Areas Affected	State Programs	Urban Study Program
WASTEWATER			
Stream pollution	. Naugatuck River . Lower Housatonic River . Estuary . Still River . Bantam River	State's Basin Planning Program (Sec. 303 e) designs and constructs sewage treatment plants.	Areawide Waste Treatment type planning (Sec. 208) will develop alternative wastewater management solutions.
Inadequate sewage treatment facilities	. Central Naugatuck Region . Valley Region . Housatonic Valley Region . Litchfield Hills Region	State's Basin Planning Program (Sec 303 e) designs and constructs sewage treatment plants.	The Areawide Waste Treatment type planning (Sec 208) will use the existing facilities as a base in developing wastewater management solutions.
Septic tank failures	. Central Naugatuck Region . Valley Region . Housatonic Valley Region . Litchfield Hills Region	The Connecticut Agricultural Research Station is testing the renovative capacities of soils. New Dept of Health/Environmental Protection regulations will limit development in septic tank failure prone areas.	An analysis will be performed to determine allowable density of development based on the impact of subsurface disposal of sewage upon the quality of potable water supplies.
Infiltration into sewer lines	. Central Naugatuck Region . Valley Region . Housatonic Valley Region . Litchfield Hills Region	Municipal Facilities Planning (Sec 201) will include infiltration/inflow analyses.	

Table 3-2

HOUSATONIC BASIN
PROBLEMS AND PROGRAMS

PROBLEMS		PROGRAMS	
Type of Problem	Areas Affected	State Programs	Urban Study Program
Combined sewers and storm sewer point pollution sources	. Central Naugatuck Region . Valley Region	Phase II of the State's Long Range Plan for the Management of Water Resources has designated this as a priority area and reviews plans by municipalities.	Water quality model will be programmed and applied on a pilot basis to solve these problems directly.
Need construction, repair, or extension of sewer lines	. Central Naugatuck Region . Valley Region . Housatonic Valley Region . Litchfield Hills Region	State's Plan of Conservation and Development will guide extensions of sewer lines. However, sewer construction is mainly the responsibility of local governments with funding help through the Dept. of Housing and Urban Development.	
Eutrophication	. Lake Zoar . Lake Lillinonah . Lake Quassapaug . Bantam Lake	The State's continuing planning process will identify the major sources of nitrates and phosphorous and will initiate control practices.	Alternative wastewater management solutions developed will consider eutrophication problems with aid of a water quality model.
Non-point pollution	. Litchfield Hills Region (Leadmine Brook)		Water quality model will be programmed and applied on a pilot basis to solve these problems directly.

Table 3-2 (cont.)

HOUSATONIC BASIN
PROBLEMS AND PROGRAMS

PROBLEMS		PROGRAMS	
Type of Problem	Areas Affected	State Programs	Urban Study Program
Cooperative agreements needed among towns	. Central Naugatuck Region . Valley Region . Housatonic Valley Region	Areawide waste treatment management planning (Sec 208) will address this problem.	Institutional analysis program will assess new laws and agreements needed to implement plans. Inadequacies of existing regulations will be investigated.
Proposal to construct industrial parks without sewers	. Central Naugatuck Region	State's plan of Conservation and Development will address this problem.	
Sewers needed but cost prohibitively expensive because of low density developments	. Valley Region		

Table 3-2 (cont.)

HOUSATONIC BASIN
PROBLEMS AND PROGRAMS

PROBLEMS		PROGRAMS	
Type of Problem	Areas Affected	State Programs	Urban Study Program
WATER SUPPLY			
Need new supply sources	. Central Naugatuck Region . Litchfield Hills Region	Statewide Long-Range Plan for the Management of the Water Resources delineates the state's recommended water supply plans for the development of new water supply sources.	Greater detail will be added to the state's plans, cost estimates will be done and the impacts of the plans will be assessed and evaluated.
Need expansion of supply system	. Central Naugatuck Region	State's Plan of Conservation and Development will guide extensions of water supply lines, and construction is the responsibility of local governments.	
Surface water or reservoir contamination	. Valley Region . Housatonic Valley Region		The Urban Study will become involved in research in groundwater contamination and the resulting reservoir and surface water contamination through the wastewater management plan formulation program.
Inadequate devopment of groundwater sources	. Housatonic Valley Region . Litchfield Hills Region	Many of the water supply sources investigated through the Statewide Long-Range Plan are groundwater sources. The groundwater studies for the state are being conducted by USGS. This is a priority area for the state.	Greater detail will be added to the state's recommended groundwater development plans. A groundwater quality monitoring system will be set up.

Table 3-2 (cont.)

HOUSATONIC BASIN
PROBLEMS AND PROGRAMS

PROBLEMS		PROGRAMS	
Type of Problem	Areas Affected	State Programs	Urban Study Program
Aquifer contamination	. Central Naugatuck Region . Valley Region . Housatonic Valley Region . Litchfield Hills Region.	The Connecticut Agricultural Research Station is testing the renovative capacities of soils in the basin to determine causes of contamination.	The Urban Study will become involved in research on aquifer contamination on a pilot basis through a ground-water quality monitoring system.
Poor service by private water company	. Housatonic Valley Region	State's Public Utilities Commission regulates operations of private water supply purveyers.	Institutional analysis program will address legal, institutional and financial requirements for any water supply plans developed and will design new or modified arrangements where necessary
Impoundment owned by power company not available for water supply	. Housatonic Valley Region		
Fragmentation of ownership and management of water supply facilities	. Central Naugatuck Region		
Financial pressure on private water companies to dispose of holdings	. Central Naugatuck Region . Valley Region	A recent state law requires the state to develop criteria for the review of the sale of water company holdings.	

Table 3-2 (cont.)

HOUSATONIC BASIN
PROBLEMS AND PROGRAMS

PROBLEMS		PROGRAMS	
Type of Problem	Areas Affected	State Programs	Urban Study Program
Health ordinances needed to protect water bodies from pollution	. Northwestern Region	Septic tank regulations are currently under review to make them more stringent.	Institutional analysis program will address legal, institutional and financial requirements for any water supply plans developed and will design new or modified arrangements where necessary.
Water supply reservoirs use pre-empted by other regions	. Litchfield Hills Region		

Table 3-2 (cont.)

HOUSATONIC BASIN
PROBLEMS AND PROGRAMS

PROBLEMS		PROGRAMS	
Type of Problem	Areas Affected	State Program	Urban Study Program
FLOOD CONTROL			
River flooding	. Pomperaug River . Still River	Structural and non-structural solutions to flood problems are developed through special appropriations of the state legislature.	Flooding problems will be investigated and structural and non-structural solutions devised as needed. Survey scope design will be completed where necessary.
Channel constrictions	. Central Naugatuck Region . Litchfield Hills Region		
Flood proofing urban areas needed	. Litchfield Hills Region		
Dam, flood works repair	. Central Naugatuck Region		
Bank erosion	. Pomperaug River	The state addresses bank erosion problems in conjuction with the Resource Conservation and Development Program of the Soils Conservation Service.	Problems will be investigated and solutions devised.
Encroachment into flood plain Lack of flood plain zoning	. Central Naugatuck Region . Housatonic Valley Region . Northwestern Region . Litchfield Hills Region	Flood plains are delineated by the state's Channel Encroachment Line Program and for the state by HUD and SCS. However, zoning of the flood plain against encroachment is the responsibility of local governments.	The institutional encumbrances will be investigated and solution devised. The solutions will be implemented on a pilot basis.

Table 3-2 (cont.)

HOUSATONIC IN
PROBLEMS AND PROGRAMS

PROBLEMS		PROGRAMS	
Type of Problem	Areas Affected	State Program	Urban Study Program
OTHER PROBLEMS			
Water recreational facilities needed	. Central Naugatuck Region . Housatonic Valley Region	Plans devised in Statewide Comprehensive Outdoor Recreation Plan and state's proposed Plan of Conservation and Development.	These needs will also be addressed through multi-objective planning concept.
Deteriorating, congested, riverfront	. Valley Region		Multi-objective planning will address this and other urban problems.
Reclamation of open pits caused by sand and gravel industries needed	. Valley Region		Land treatment and sludge disposal systems will be investigated as possible solutions.
Large tracts of land in public ownership reduce local tax base	. Northwestern Region		The institutional analysis program will address this problem.

Table 3-2 (Cont'd)

WASTEWATER MANAGEMENT

Note: Table entries for "Responsible Agency", "Man-Years", "$10^{3}", and "Completion Date" refer to the numbered "work elements", not to the lettered "work elements".

FEDERAL AND NON-FEDERAL EFFORT
PREPARATION OF PLAN OF STUDY
WASTEWATER MANAGEMENT

Work Element/Description	Responsible Agency	Man-Years	10^3	Completion Date
1. Stage I of study effort	COE	0.63	25.0	JUL 74
a. Identification of study area	IWRPB	.30	6.0	
b. Description of existing problems	RPA	*	*	
c. Statement of study planning objectives				
d. Current planning and related data				
e. Public involvement strategy				
f. Institutional arrangements				
g. Study Management				
2. Study effort allocation	COE	0.63	25.0	JUL 74
	IWRPB	0.30	6.0	
a. Major work items	RPA	*	*	
b. Scheduling of work tasks				
c. Study costs				
3. Plan of study coordination	COE	0.25	10.0	JUL 74
	IWRPB	0.05	1.0	
a. Stage I public involvement	RPA	*	*	
b. Agency approval				
Total				
Federal		1.5	60.0	
Non-Federal		0.7	13.0	

* Effort supported by Federal Funds.

Table 3-3

FEDERAL AND NON-FEDERAL EFFORT
DATA COLLECTION AND PROJECTION
WASTEWATER MANAGEMENT

Table 3-4

Work Element/Description	Responsible Agency (1)	Cost		Completion Date (4)
		Man-years (2)	10^3 (3)	
*1. Historical and projected population and economic data	COE	0.07	3.0	COMPLETED IN PART
* a. Urban and rural population				
* b. Industrial employment by 2 and 3 digit SIC				
* c. Agricultural crop acreage and type of cropping				
* d. Compare with OBERS projections				
*2. Historical and projected water use and facilities	COE	0.05	2.0	COMPLETED IN PART
* a. Municipal				
* b. Industrial by Census Industrial Sector				
* c. Irrigation				
* d. Review and adjust where necessary				
*3. Historical and projected waste sources and facilities showing flow rate, constituents and concentrations	COE IWRPB	0.13 0.25	5.0 5.0	COMPLETED IN PART
* a. Public and municipal				
* b. Industrial				
* c. Irrigation return flows				
* d. Oil and gas field operations				
* e. Urban and rural storm runoff				
* f. Sanitary landfills				
* g. Open dumps				
* h. Field collection and analysis of water quality data where none available				

FEDERAL AND NON-FEDERAL EFFORT
DATA COLLECTION AND PROJECTION
WASTEWATER MANAGEMENT

Table 3-4 (Cont'd)

Work Element/Description	Responsible Agency (1)	Cost: Man-years (2)	Cost: 10^3 (3)	Completion Date (4)
* 4. Existing and projected land use plans	RPA	0.1	2.0	COMPLETED IN PART
* a. Adopted land use plans				
* b. Best estimates where none exist				
* 5. Surface water quality data	IWRPB COE	0.25 0.13	5.0 5.0	COMPLETED IN PART
* a. Description of data needed				
* b. Prepare map showing monitoring stations				
* c. List water quality parameters monitored				
* d. Inventory existing violators				
* e. Identify, locate and obtain additional data				
* 6. Stream standards	IWRPB	--	--	COMPLETED
* a. Description of existing standards				
* b. Identification of inadequacies, if any				
* c. Tentative revised standards by stream reach and for all necessary parameters				
* 7. Water rights criteria or constraints that may affect design of upstream treatment systems	COE	0.13	5.0	

FEDERAL AND NON-FEDERAL EFFORT
DATA COLLECTION AND PROJECTION
WASTEWATER MANAGEMENT

Table 4 (Cont'd)

Work Element/Description	Responsible Agency (1)	Cost: Man-years (2)	Cost: 10^3 (3)	Completion Date (4)
* 8. Groundwater quality and quantity	COE	0.25	10.0	COMPLETED IN PART
* a. Availability by county and/or aquifer from existing sources with refinements where possible				
* b. Recommend areas which should be considered for groundwater recharge with treated wastewater				
* 9. Provide data on existing significant botanical, zoological, archeological and historical basin features	RPA	0.2	4.0	COMPLETED IN PART
* 10. Review, select and implement a data handling and storage program	COE IWRP B COE	0.13 0.25 0.13	5.0 5.0 5.0	
* 11. Data and inventory assessment				
* a. Assess for validity				
* b. Assess for coverage				
* c. Determine data gaps				
* d. Prepare program for incremental data acquisition				
* e. Provide a complete inventory of data source				
Totals				
Federal		1.0	40.0	
Non-Federal		1.1	21.0	

*Work [illegible]s agreed upon by the Corps, EPA, and the Office [illegible]anagement and Budget (OMB)

FEDERAL AND NON-FEDERAL EFFORT
FORMULATION OF ALTERNATIVES
WASTEWATER MANAGEMENT

	Work Element/Description	Responsible Agency (1)	Cost Man-years (2)	Cost 10^3 (3)	Completion Date (4)
*	1. Identify and designate the wastewater management planning areas	COE IWRPB RPA	.07 .11 .05	2.5 2.2 1.0	
	a. Areawide waste treatment management areas (Sec. 208)				
	b. Water quality limitation segments (Sec. 303e)				
	c. Effluent limitation segments (Sec. 303e)				
	d. Eutrophic lakes				
	e. Other, esp. early action program areas (Litchfield)				
*	2. Water quality basin model	COE IWRPB	1.0 1.5	40.0 30.0	
*	a. Review, test, select and adopt model				
*	b. Adapt, verify and refine model				
	c. Adopt and apply additional modules				
	(1) nutrient control				
	(2) urban and non-point runoff				
	(3) multiple-use effects				
	(a) water supply (flood skimming, diversions)				
	(b) recreation, fish and wildlife				
	(c) low flow augmentation				
	(d) flood control				
	(e) hydropower				

Table 3-5

FEDERAL AND NON-FEDERAL EFFORT
FORMULATION OF ALTERNATIVES
WASTEWATER MANAGEMENT

Work Element/Description	Responsible Agency (1)	Cost		Completion Date (4)
		Man-years (2)	10^3 (3)	
* 3. Alternatives to be developed	COE	4.5	180.	
	IWRPB	.83	16.5	
* a. Develop wastewater management alternatives to meet two goals	RPA	.25	5.	
* (1) highest levels of wastewater treatment				
(a) 1985 goal (elimination of discharge of pollutants)				
(b) July 1, 1983 (municipal: best practicable) (industrial:best available)				
(2) meet current requirements				
* (a) July 1, 1977 (municipal:secondary treatment) (industrial:best practicable)				
* (b) current state standards				
* b. Existing wastewater management plans will be utilized in developing one or more of the above alternatives				
* c. Alternatives to be developed include the following:				
* (1) land disposal (Litchfield)				
* (2) biological and physical - chemical				
* (3) combinations of (1) and (2) including nonstructural.				
d. Alternatives to be developed to consider the following:				

Table 3-5 (Cont'd)

FEDERAL AND NON-FEDERAL EFFORT
FORMULATION OF ALTERNATIVES
WASTEWATER MANAGEMENT

Work Element/Description	Responsible Agency (1)	Cost		Completion Date (4)
		Man-years (2)	10^3 (3)	
(1) nutrient problems (eutrophication) (2) sewer system infiltration-inflow (3) non-point pollution sources (4) septic tank performance (5) storm sewer point sources (6) municipal and industrial sources				
4. Wastewater management plan	COE IWRPB RPA	0.38 .25 .1	15.0 5.0 2.0	July 1976
a. Alternative plans will include provisions for capital improvements, management programs, continuing planning activities, institutional and organizational arrangements, and implementation programs.				
b. The product of this planning process will consist of the following:				
(1) a series of three to seven alternative urban water resources plans to meet long range (approximately 50 years) needs, from which a choice may be made prior to completion of the study; (2) a priced and evaluated portion of each of the alternative urban water resource plans to meet short range (approximately 20 years) needs; (3) a phased early action program for the study region for each alternative urban water resource plan to meet short range (approximately 20 years) needs; and				

Table 3-5 (Cont'd)

FEDERAL AND NON-FEDERAL EFFORT
FORMULATION OF ALTERNATIVES
WASTEWATER MANAGEMENT

Work Element/Description	Responsible Agency (1)	Cost		Completion Date (4)
		Man-years (2)	10^3 (3)	
(4) if appropriate, a proposal for Congressional authorization of selected elements of the early action program of the publicly selected "best" plan.				
Totals				
Federal		5.9	237.5	
Non-Federal		3.1	61.7	

Table 3-5 (Cont'd)

*Work tasks agreed upon by the Corps, EPA, and the Office of Management and Budget (OMB).

FEDERAL AND NON-FEDERAL EFFORT
IMPACT ASSESSMENT AND EVALUATION
WASTEWATER MANAGEMENT

Work Element/Description	Responsible Agency (1)	Cost: Man-years (2)	Cost: 10^3 (3)	Completion Date (4)
* 1. Assess beneficial and adverse impacts of alternative plans.	COE	0.88	35.0	
	IWRPB	0.5	10.0	
	RPA	0.25	5.0	
a. Identification and measurement of impacts				
* (1) economic				
* * (2) social				
* (3) environmental				
(4) legal				
* (a) water rights				
(b) state Clean Water Act				
(c) Federal Water Pollution Control Act Amendments				
(5) institutional				
* (a) analysis - identification and assessment of capabilities (financial capabilities)				
(b) arrangements - modification, creation, etc.				
b. Display impacts for evaluation				
* 2. Compare performance of alternative plans	COE	0.13	5.0	
	IWRPB	0.4	8.0	
a. Technical objectives				
b. Cost-effectiveness				

Table 3-6

FEDERAL AND NON-FEDERAL EFFORT
IMPACT ASSESSMENT AND EVALUATION
WASTEWATER MANAGEMENT

Table 3-6 (Cont'd)

Work Element/Description	Responsible Agency (1)	Cost: Man-years (2)	Cost: 10^3 (3)	Completion Date (4)
3. Evaluation of alternative plans	COE	0.75	30.0	
	IWRPB	1.0	20.0	
a. Identify issue, problem, concerns or objective to which an impact is related.	RPA	0.25	5.0	
b. Attribute beneficial or detrimental value to impact				
c. Display results for decision-makers (1) national accounts (2) preference sets				
* 4. Select alternative plan for implementation	COE IWRPB RPA	COSTS INCLUDED IN STUDY MANAGEMENT		
Totals				
Federal		1.8	70.0	
Non-Federal		2.4	48.0	

*Work tasks agreed upon by the Corps, EPA, and the Office of Management and Budget (OMB).

FEDERAL AND NON-FEDERAL EFFORT
PUBLIC INVOLVEMENT PROGRAM
WASTEWATER MANAGEMENT

Table 3-7

	WORK ELEMENT/DESCRIPTION	Responsible Agency	Cost Man-Years	Cost 10^3	Completion Date
*	1. Development of a plan of study				
	a. Articulate specific public involvement objectives	COE		**	JULY 74
*	b. Develop a public involvement program plan	IWRPB		**	
	c. Commence public involvement	RPA		**	
	2. Identification of publics	COE	0.05	2.0	
*	a. Compilation of mailing list of individuals and organizations	IWRPB	0.03	0.5	
	b. Identification of specific interest groups and desired roles	RPA	0.1	2.0	***
	3. Information and education	COE	0.50	20.0	
	a. Selection of alternative techniques				
*	b. Personnel to do work with news media				
*	c. Preparation of brochures, newsletters, etc.				
	4. Establishment of structured opportunities for public communication and involvement	COE	0.33	13.0	
		IWRPB	0.6	12.0	
	a. Establish ad hoc, advisory and management groups	RPA	3.03	60.5	***
	b. Conduct public meetings, seminars, workshops, etc.				
*	(1) arrangements for meeting places				
*	(2) preparation of public announcement				
*	(3) personnel to conduct workshops, etc.				
	(4) solicit, monitor and record public statements				
	c. Analyze public statements and implement feedback				

FEDERAL AND NON-FEDERAL EFFORT
PUBLIC INVOLVEMENT PROGRAM
WASTEWATER MANAGEMENT

WORK ELEMENT/DESCRIPTION	Responsible Agency	Cost		Completio Date
		Man-Years	10^3	
5. Evaluation of program impact a. Monitor program activities b. Assess impact of program and publics c. Evaluate program in terms of objectives d. Modify programs and plan	COE	0.13	5.	
Total				
Federal		4.1	102.5	***
Non-Federal		0.6	12.5	

Table 3-7 (Cont'd)

*Work tasks agreed upon by the Corps, EPA, and the Office of Management and Budget (OMB).
**Cost considered in preparation of Plan of Study.
***Comprises 62.5 thousand dollars allocated to support RPA public involvement activities.

FEDERAL AND NON-FEDERAL EFFORT
IMPLEMENTATION ARRANGEMENTS
WASTEWATER MANAGEMENT

	Work Element/Description	Responsible Agency (1)	Cost Man-years (2)	Cost 10^3 (3)	Completion Date (4)
*	1. Prepare construction schedules for each of the wastewater planning subareas to meet the highest priority short range basin goals	COE 1WRPB RPA	0.06 0.02 0.03	2.5 0.3 0.6	
*	2. Develop and recommend appropriate institutional arrangements for:	COE 1WRPB RPA	0.05 0.10 0.25	20.0 2.0 5.0	
*	a. Execution of advanced engineering and design and construction				
*	b. Operation and maintenance				
*	c. Major replacements				
*	d. Continuing planning and management responsibility				
	3. Develop alternative plans for acquiring interest in necessary lands associated with selected alternatives	COE 1WRPB RPA	0.06 0.01 0 .03	2.5 0.2 0.6	
*	4. Develop and recommend financing and cost sharing arrangements	COE 1WRPB RPA	0.13 0.03 0.07	5.0 0.5 1.3	
*	5. Adopt certifiable plans	NOT CONSIDERED STUDY COST			
	Totals Federal Non-Federal		0.75 0 .53	30.0 10.5	

* Work tasks agreed upon by the Corps, EPA, and the Office of Management and Budget (OMB).

Table 3-8

FEDERAL AND NON-FEDERAL EFFORT
REPORT PREPARATION
WASTEWATER MANAGEMENT

ORK ELEMENT/DESCRIPTION	Responsible Agency (1)	COST Man-years (2)	COST $10[illegible] (3)	Completion Date (4)
. Report preparation	COE	1.00	40.(	July 76
a. Feasibility reports	IWRPB	0.5	10.(	
b. Survey report	RPA	0.63	12.5	
(1) summary document				
(2) Primary appendices				
(a) background information				
(b) plan formulation documents				
(c) comments on draft report				
(3) specialty appendices				
(a) design and costs				
(b) impact assessment and evaluation				
(c) institutional analysis				
(d) public involvement				
Totals				
Federal		1.0	40.0	
Non-Federal		1.1	22.5	

Table 3-9

Table 3-9

FEDERAL AND NON-FEDERAL EFFORT
STUDY MANAGEMENT
WASTEWATER MANAGEMENT

Work Element/Description	Responsible Agency (1)	Man-years (2)	10^3 (3)	Completion Date (4)
1. Executive group functions	COE Conn. RPA	*	*	July 76
2. Administrative group functions	COE Conn. EPA Municipal	*	*	July 76
3. Operational group functions	COE	0.50	20.0	
a. Meet periodically to monitor progress, reassess schedules and establish priorities.	Conn.(IWRPB) Regional (RPA) EPA	0.24 0.3	4.8 6.0	July 76
b. Prepare scopes of work and monitor consultant services.	Public			
4. Advisory group functions	COE		**	July 76
a. Serve as advisors on programs (effort components) and major work items.	Conn.(IWRPB) Regional (RPA)			
b. Prepare periodic reports and presentations.	Public EPA			
c. Participate in public involvement activities.	Other Federal, State & Local			
d. Assist in developing scopes of work and monitor consultant efforts.				
Totals				
Federal		0.5	20.0	
Non-Federal		0.5	10.8	

*Included in overhead as administrative and management.
**Included in costs attributed to respective effort components.

Table 3-10

WATER SUPPLY MANAGEMENT

The following tables have been omitted because the tasks they list duplicate Wastewater Management tasks:

Preparation of a Plan of Study
Impact Assessment and Evaluation
Public Involvement
Implementation Arrangements
Study Documentation and Report Preparation
Study Management

Note: Table entries for "Responsible Agency", "Man-Years", "10^3", and "Completion Date" refer to the numbered "work elements", not to the lettered "work elements".

FEDERAL AND NON-FEDERAL EFFORT
DATA COLLECTION AND PROJECTION
WATER SUPPLY

Work Element/Description	Responsible Agency	Cost		Completion Date
		Man-Years	10^3	
1. Identify present and projected water service areas in Housatonic River Basin	COE	0.09	3.7	Completed in Part
2. Determine present and projected population of the identified water service areas for the study area.	COE	0.10	4.0	Completed in Part
3. Determine present and projected municipal domestic and industrial water demands within identified water service areas.	COE	0.10	4.0	Completed in Part
4. Determine present and projected water supply systems capabilities and deficits in correlation with source yields, treatment capacity and transmission facilities within identified water service areas.	COE	0.25	10.0	Completed in Part
5. Identify water sources potential to study area.	COE	0.13	5.0	Completed in Part
Total				
Federal		0.7	26.7	
Non-Federal				

Table 3-11

FEDERAL AND NON-FEDERAL EFFORT
FORMULATION OF ALTERNATIVES
WATER SUPPLY

Work Element/Description	Responsible Agency	Cost		Completion Date
		Man-Years	10^3	
1. Develop feasibility level water supply alternative plans	IWRPB			Completed
2. Do cost estimating for feasibility level plans	COE	0.25	10.0	Completed in part
3. Develop survey level alternative water supply plans including borings, geology, flow records, hydrology, etc.	COE	2.71	108.3	
4. Do survey level cost estimating for water supply plans.	COE	0.50	20.0	January 76
5. Perform an analysis of a basin to determine the density of development that could be allowed by subsurface disposal so as not to impair the quality of water for water supply.	COE	0.13	5.0	January 76
6. Develop a monitoring system to analyze changes in groundwater quality and apply it on a pilot basis.	COE	0.38	15.0	January 76
Total				
Federal				
Non-Federal		4.0	158.3	

Table 3-12

FLOOD CONTROL & FLOOD PLAIN MANAGEMENT

The following tables have been omitted because the tasks they list duplicate Wastewater Management tasks:

Preparation of a Plan of Study
Impact Assessment and Evaluation
Public Involvement
Implementation Arrangements
Study Documentation and Report Preparation
Study Management

Note: Table entries for "Responsible Agency", "Man-Years", "10^3", and "Completion Date" refer to the numbered "work elements", not to the lettered "work elements".

FEDERAL AND NON-FEDERAL EFFORT
DATA COLLECTION AND PROJECTION
FLOOD CONTROL & FLOOD PLAIN MANAGEMENT

Work Element/Description	Responsible Agency	Cost		Completion Date
		Man-Years	10^3	
1. Collect data and conduct flood damage surveys for flood problem areas.	COE	0.11	4.3	October 75
2. Collect data for flood plain delineation studies.	COE	0.13	5.0	October 75
3. Collect data for erosion studies	COE	0.10	4.0	October 75
Total				
Federal				
Non-Federal		0.3	13.3	

Table 3-13

FEDERAL AND NON-FEDERAL EFFORT
FORMULATION OF ALTERNATIVES
FLOOD CONTROL & FLOOD PLAIN MANAGEMENT

Work Element/Description	Responsible Agency	Man-Years	10^3	Completion Date
1. Develop feasibility level flood control plans for flood problem areas.		NOT ANTICIPATED		
2. Conduct erosion studies on the Pomperaug River	COE	0.38	15.0	January 76
3. Do flood plain delineation studies.	COE	1.50	60.0	January 76
4. Implement flood plain regulation on a pilot basis.	COE	0.11	4.2	January 76
Total				
Federal		2.0	79.2	
Non-Federal				

Table 3-14

SCHEDULING

Chronologically, the Housatonic Urban Study is divided into three stages extending over two years (excluding the period for the production of the Plan of Study). For simplicity, the work items have been grouped into programs called effort components. The effort components are as follows:

Data Collection
Formulation of Alternatives
Impact Assessment and Evaluation
Institutional Arrangements
Public Involvement
Study Documentation and Report Preparation
Study Management

In the discussion that follows, the effort components are defined and their dispersion over the three stages of the study is explained.

Stage I - Preliminary Planning

Stage I will consume most of the remainder of 1974. The most important effort component in Stage I is the Data Collection which encompasses the development of a profile of both public concerns in the form of water resource planning objectives and statistical or descriptive data. The Data Collection will become more specific in nature as the technical detail of the water resource alternatives increases.

Stage II - Feasibility Planning

Stage II will extend approximately to the end of FY 1975. This stage consists of one complete iteration of the planning process, each iteration consisting of the formulation of alternative solutions and the assessment and evaluation of their impacts.

The formulation of alternatives as an effort component addresses the problems and concerns of the urban areas by achieving the water resource planning objectives. It is the actual development of technical solutions to water resource problems. In Stage I, the solutions are conceptualized; in Stage II, they are designed in a rough level of detail (feasibility detail), and in Stage III, the solutions are reduced in number to about 3 and the detailed (survey scope) design is accomplished with necessary engineering investigations, including borings, flow records, and hydrology.

The impact assessment and the evaluation are included in the same effort component. Impact assessment is the process through which the changes associated with alternative plans are identified and measured. This process provides for analyzing the alternatives to ascertain their full range of economic, social and environmental effects. The evaluation of the urban water resources plans is accomplished by comparing the impacts of the alternative plans with the water resource planning objectives and the regional problems, concerns, and issues that the planning effort was directed to achieve. The performance of the alternative plans in relation to these objectives and

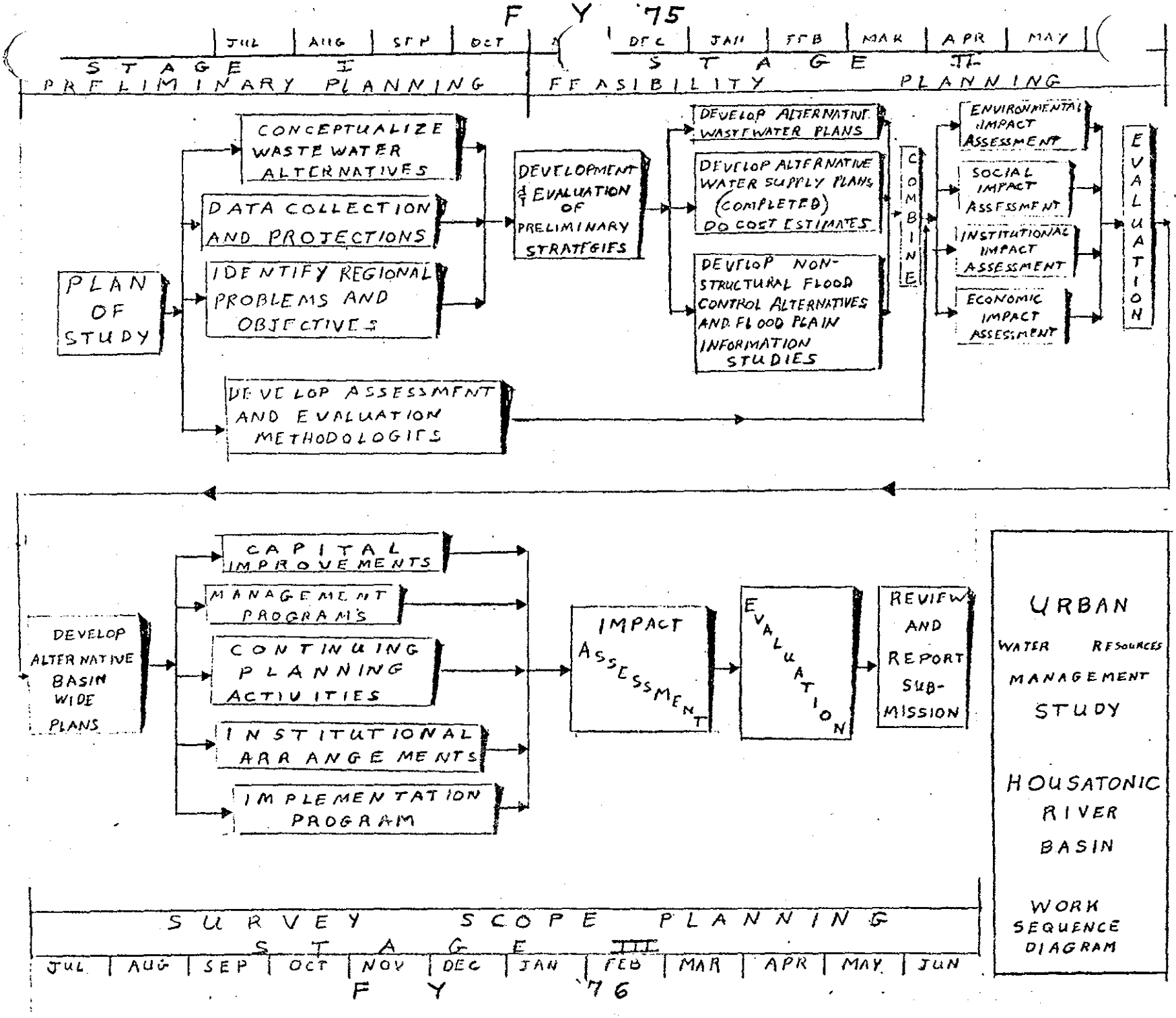

F Y '75
JUL
AUG
SEP
OCT
DEC
JAN
FEB
MAR
APR
MAY
STAGE I
PRELIMINARY PLANNING
STAGE II
FEASIBILITY PLANNING
PLAN OF STUDY
CONCEPTUALIZE WASTE WATER ALTERNATIVES
DATA COLLECTION AND PROJECTIONS
IDENTIFY REGIONAL PROBLEMS AND OBJECTIVES
DEVELOP ASSESSMENT AND EVALUATION METHODOLOGIES
DEVELOPMENT & EVALUATION OF PRELIMINARY STRATEGIES
DEVELOP ALTERNATIVE WASTEWATER PLANS
DEVELOP ALTERNATIVE WATER SUPPLY PLANS (COMPLETED) DO COST ESTIMATES
DEVELOP NON-STRUCTURAL FLOOD CONTROL ALTERNATIVES AND FLOOD PLAIN INFORMATION STUDIES
COMBINE
ENVIRONMENTAL IMPACT ASSESSMENT
SOCIAL IMPACT ASSESSMENT
INSTITUTIONAL IMPACT ASSESSMENT
ECONOMIC IMPACT ASSESSMENT
EVALUATION
DEVELOP ALTERNATIVE BASIN WIDE PLANS
CAPITAL IMPROVEMENTS
MANAGEMENT PROGRAMS
CONTINUING PLANNING ACTIVITIES
INSTITUTIONAL ARRANGEMENTS
IMPLEMENTATION PROGRAM
IMPACT ASSESSMENT
EVALUATION
REVIEW AND REPORT SUBMISSION
SURVEY SCOPE PLANNING
STAGE III
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
F Y '76
URBAN WATER RESOURCES MANAGEMENT STUDY
HOUSATONIC RIVER BASIN
WORK SEQUENCE DIAGRAM

Plate 3-1

concerns provides the yardstick for measuring the expected results of the alternatives. A meaningful evaluation is facilitated by an active public involvement effort.

Stage III - Survey Scope Planning

Stage III will consume all of FY 1976. As mentioned above, it will include the final iteration; including the survey scope design for 3 or more alternatives and their impact assessment and evaluation. The final result will consist of one recommended basin wide plan.

Three other effort components will be emphasized during this stage. The Institutional Arrangements effort component includes the institutional analysis whereby institutions, meaning highly structured organizations and procedures, are identified and their capabilities assessed with respect to the implementation of alternative plans. New institutional arrangements are designed and steps for their implementation are outlined. For further detail consult the section entitled Institutional Arrangements.

Stage III also includes a crucial part of the Public Participation effort component, although public involvement is necessary and expected throughout the study. For further detail consult the section entitled Public Involvement Strategy.

The final result of Stage III will be the Survey Report which will consist of a separate summary document, designed to be read by the non-technical reader, and the appendices in the form of ancillary documents. The Study Documentation and Report Preparation effort component will take place throughout the study through the continuous drafting of the appendices.

Finally, the Study Management effort component, discussed in greater detail in the section entitled Study Management, will continue throughout the three stages of the study.

A work schedule is presented on the work sequence diagram, which indicates the sequence and interdependence of effort components and identifies the planning stage at which they occur.

STUDY COSTS

The total cost for the Housatonic River Basin water resources study in Connecticut is estimated to be $1,460,000. Estimated Federal effort is $1,200,000, $600,000 of which is programmed for wastewater management planning. Non-Federal effort, in either cash or manpower contributions or in combination of the two - from the member departments of the state Interagency Water Resources Planning Board, and the regional planning agencies of the basin - is estimated to be $260,000. $200,000 of this effort is the minimum non-Federal effort sharing required for the wastewater portion of the study. The latter effort neither includes approximately $125,000 of Federal funds which shall be used to support the public involvement activities of the regional planning agencies, nor does it include possible Federal support of their technical expertise in required work tasks.

A detailed estimate of costs by work item and effort component is provided in the following tables.

SUMMARY

Total Study Costs by Major Work Item and Effort Component

EFFORT COMPONENTS / WORK ITEMS	Flood Control and Flood Plain Management	Wastewater Management	Water Supply Management	TOTAL FOR EFFORT COMPONENT
1. Preparation of a Plan of Study	24.0	73.0	48.0	145.0
2. Plan Formulation and Evaluation				
a. Data Collection	13.3	61.0	26.7	101.0
b. Formulation of Alternatives	79.2	299.2	158.3	536.7
c. Impact Assessment and Evaluation	23.4	118.0	46.6	188.0
d. Public Involvement	38.3	115.0	76.7	230.0
e. Implementation Arrangements	10.0	40.5	20.0	70.5
3. Study Documentation and Report Preparation	20.5	62.5	42.0	125.0
4. Study Management	10.3	30.8	20.5	61.6
TOTAL FOR WORK ITEM	219.0	800.0	438.8	1457.8

All table entries in Thousand Dollars ($x10^3$)

Table 3-15

SUMMARY

Federal and Non-Federal Efforts by Major Work Item

Major Work Items	Federal		Non-Federal		Total for Major Work Items	
	Man-Years	Cost($1000)	Man-Years	Cost($1000)	Man-Years	Cost($1000
Flood Control and Flood Plain Management	5.0	200.0	1.0	19.0	6.0	219.0
Wastewater Management	15.0	600.0	10.0	200.0	25.0	800.0
Water Supply Management	10.0	400.0	1.9	38.8	11.9	438.8
Totals	30.0	1200.0	12.9	257.8	42.9	1457.8

Table 3-16

WASTEWATER MANAGEMENT

Federal and Non-Federal Efforts

Effort Component	Federal		Non-Federal		Total for Effort Component	
	Man-Years	Cost($1000)	Man-Years	Cost($1000)	Man-Years	Cost ($1000)
1. Preparation of a Plan of Study	1.50	60.0	.65	13.0	2.15	73.0
2. Plan Formulation and Evaluation						
a. Data Collection	1.00	40.0	1.05	21.0	2.05	61.0
b. Formulation of Alternatives	5.94	237.5	3.09	61.7	9.03	299.2
c. Impact Assessment and Evaluation	1.75	70.0	2.40	48.0	4.15	118.0
d. Public Involvement	2.56	102.5	.63	12.5	3.19	115.0
e. Implementation Arrangements	0.75	30.0	.53	10.5	1.28	40.5
3. Study Documentation and Report Preparation	1.00	40.0	1.13	22.5	2.13	62.5
4. Study Management	0.50	20.0	.54	10.8	1.04	30.8
Total for Effort	15.0	600.0	10.0	200.0	25.0	800.0

FLOOD CONTROL & FLOOD PLAIN MGT — FEDERAL AND NON FEDERAL EFFORTS

Effort Component	Federal		Non-Federal		Total for Effort Component	
	Man-Years	Cost($1000)	Man-Years	Cost($1000)	Man-Years	Cost($1000)
1. Preparation of a Plan of Study	0.50	20.0	0.20	4.0	0.70	24.0
2. Plan formulation and Evaluation						
a. Data Collection	0.33	13.3	-	-	0.33	13.3
b. Formulation of Alternatives	2.00	79.2	-	-	2.00	79.2
c. Impact Assessment and Evaluation	0.59	23.4	-	-	0.59	23.4
d. Public Involvement	0.85	34.1	0.21	4.2	1.06	38.3
e. Implementation Arrangements	0.25	10.0	-	-	0.25	10.0
3. Study Documentation and Report Preparation	0.33	13.3	0.36	7.2	0.69	20.5
4. Study Management	0.17	6.7	0.18	3.6	0.35	10.3
Total for Effort	5.0	200.0	1.0	19.0	6.0	219.0

Table 3-19

SUMMARY

Federal and Non-Federal Efforts

Effort Component	Federal		Non-Federal		Total for Effort Component	
	Man-Years	Cost($1000)	Man-Years	Cost($1000)	Man-Years	Cost($1000)
1. Preparation of a Plan of Study	3.00	120.0	1.25	25.0	4.25	145.0
2. Plan Formulation and Evaluation						
a. Data Collection	2.00	80.0	1.05	21.0	3.05	101.0
b. Formulation of Alternatives	11.88	475.0	3.09	61.7	14.97	536.7
c. Impact Assessment and Evaluation	3.50	140.0	2.40	48.0	5.9	188.0
d. Public Involvement	5.13	205.0	1.25	25.0	6.38	230.0
e. Implementation Arrangements	1.50	60.0	.53	10.5	2.03	70.5
3. Study Documentation and Report Preparation	2.00	80.0	2.25	45.0	4.25	125.0
4. Study Management	1.00	40.0	1.08	21.6	2.08	61.6
Total for Effort	30.0	1200.0	12.9	257.8	42.9	1457.8

Table 3-20

SECTION IV

PLAN OF STUDY COORDINATION

Stage One Public Involvement

Agency Approval

STAGE I PUBLIC INVOLVEMENT

The basic objective of the Stage I Public Involvement Program has been to identify and establish working relationships with Federal, state and local agencies and with significant basin groups. Further objectives have been to inform these agencies of the study, to insure coordination with their ongoing programs and to solicit inputs into the plan of study, especially in the areas of need identification, the development of goals and objectives and the development of work tasks.

During the preparation of the Plan of Study, coordination has taken place with Senator Ribicoff and Representative Grasso, the sponsors of the resolutions establishing the study. An initial coordination meeting, called by the New England River Basins Commission, included the participation of the water resource planners of the states of Massachusetts and Connecticut, the Commission, the Soil Conservation Service, and the North Atlantic and New England Divisions of the Corps of Engineers. The meeting established a coordinated relationship between the Corps' Housatonic River basin study and the Commission's proposal for a level B study of the same basin. Subsequent meetings have been held with Region I of the Environmental Protection Agency, the State of Connecticut's Interagency Water Resources Planning Board, Water Resources Technical Board, and the five Regional Planning Agencies of the basin. These meetings, under the chairmanship of the Governor's coordinator have led to the management system, work items, and funding arrangements set forth herein.

The services of the five Regional Planning Agencies have been purchased for aid in the development of the Plan of Study. The products of these services are narrative descriptions of the study area, the existing problems, the institutional arrangements, and the current programs peculiar to each RPA area, and statements of local objectives as well as discussions of public involvement strategy. The working relationships engendered by these contract services have been excellent.

Periodic meetings have been held with the Directors, Executive Director and members of the Housatonic Valley Association - public sponsor of the Congressional Resolutions authorizing this study. These meetings varied from presentations of the status of the development of the plan of study, to discussions of the Association's role in the study.

Meetings and presentations, at public request, have included audiences of Lake Authorities, schools, and environmental and professional organizations. These offered an opportunity to develop and use a mobile display, make appearances on local television and radio stations, and obtain newspaper publicity for the study.

The established relationships with the public agencies will be continued and contacts with the general public will be enhanced to include them in the formulation of alternatives, the assessment of the impacts and the evaluation of the study.

AGENCY APPROVAL

An Interim Draft dated December 1973 and a Management Review Draft dated May 1974 have been reviewed by the member departments of the State Interagency Water Resources Planning Board, the Directors of the basin Regional Planning Agencies, and the North Atlantic and New England Divisions of the Corps of Engineers. The review comments and results of subsequent coordination meetings have formed the basis for this plan of study. Other Federal and state agencies, local officials, interested organizations, and the general public will review the plan or a summary thereof, as part of a program of agency coordination and public involvement.

The inclusion of wastewater management as a major work item in this study requires non - federal effort sharing and letters of assurance from non - federal sponsors. For purposes of this study, all state and regional effort sharing as presented in this plan shall be assured in the form of a letter of assurance from the Governor of the State of Connecticut.

The Plan of Study shall also be reviewed for required approval by the Environmental Protection Agency. This approval shall relate to the plan's satisfaction of the intent of PL 92-500 and related regulations.

Following review and approval by the Governor of the State of Connecticut and the Regional administrator of the Environmental Protection Agency, the North Atlantic Division will indorse the Plan of Study to the Office of the Chief of Engineers, Washington, D.C. Upon completion of this review, the approved Plan of Study will be returned to the Division by indorsement. Receipt of this approval is sufficient authority to initiate the study.

APPENDIX A

AUTHORIZING RESOLUTIONS

92nd Congress

2nd Session

UNITED STATES SENATE
COMMITTEE ON PUBLIC WORKS

COMMITTEE RESOLUTION

RESOLVED BY THE COMMITTEE ON PUBLIC WORKS OF THE UNITED STATES SENATE, That the Secretary of the Army, acting through the Chief of Engineers, is hereby authorized, in connection with the preparation of plans to meet the long-range water needs of the northeastern United States as authorized by Section 101 of Public Law 89-298, to cooperate with the State of Connecticut in conducting a study to recommend improvements in wastewater management and alternatives thereto within the Housatonic River Basin. The scope of such study shall be established with the consultation of the State of Connecticut and the Environmental Protection Agency and shall include measures for wastewater management including cleanup and restoration in the interest of water supply, environmental quality, recreation, fish and wildlife, and other allied water purposes, and shall be conducted with the participation, consultation, and cooperation of the Environmental Protection Agency and state and local water pollution control agencies and, where appropriate, state and local agencies with environmental planning responsibilities.

Adopted: May 25, 1972

/s/
Jennings Randolph, Chairman.

(At the request of Senator Abe Ribicoff of Connecticut)

COMMITTEE ON PUBLIC WORKS
HOUSE OF REPRESENTATIVES, U.S.
WASHINGTON, D.C. 20515

R E S O L U T I O N

Resolved by the Committee on Public Works of the House of Representatives, United States, that the Secretary of the Army, acting through the Chief of Engineers, is hereby authorized, in connection with the preparation of plans to meet the long-range needs of the north-eastern United States as authorized by section 101 of Public Law 89-298, to cooperate with the State of Connecticut in conducting a study to recommend improvements in wastewater management and alternatives thereto within the Housatonic River Basin. The scope of such study shall be established with the consultation of the State of Connecticut and the Environmental Protection Agency and shall include measures for wastewater management including cleanup and restoration in the interest of water supply, environmental quality, recreation, fish and wildlife, and other allied water purposes, and shall be conducted with the participation, consultation, and cooperation of the Environmental Protection Agency and State and local water pollution control agencies and, where appropriate, State and local agencies with environmental planning responsibilities.

Adopted June 14, 1972

Attest:

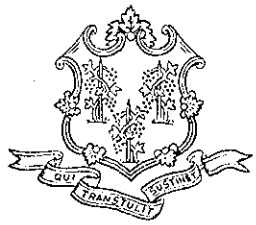
John A. Blatnik, M. C.
Chairman

Requested by: Hon. Ella T. Grasso

APPENDIX B

AGENCY APPROVAL

THOMAS J. MESKILL
GOVERNOR



STATE OF CONNECTICUT
EXECUTIVE CHAMBERS
HARTFORD

July 11, 1974

Major General R. H. Groves
Division Engineer
Department of the Army
North Atlantic Division
Corps of Engineers
90 Church Street
New York, New York 10007

Dear General Groves:

This is in follow up of my letter to you of June 20, 1974 acknowledging receipt of the Plan of Study for the Housatonic River Basin.

Mr. Harold I. Ames, Director for Planning in the Planning and Budgeting Division of the Department of Finance and Control and Chairman of the Interagency Water Resources Planning Board has reviewed the Plan of Study and consulted with other concerned state personnel including members of my staff. He advises me that he and those with whom he is consulted are in substantial agreement with the Plan of Study and that I should inform you of the state's interest in pursuing the project. It is my understanding, however, that if deemed advisable by the Policy Group managing the project (because of now unforeseen problems or opportunities) the Plan of Study may be revised during its execution, thus offering dynamic opportunity to best serve the interests of the Basin.

I am thus satisfied with the Plan of Study, including the policy and management structure and provision for community and citizen participation.

Fiscally, the State of Connecticut operates on an annual basis, July 1 to June 30, and thus financial commitments cannot be made binding on future budgets. However, I give you my assurance that it is the present intention of the State of Connecticut to meet its financial obligations to the extent required in providing 25% of the cost of the Wastewater Management aspects of the study through a combination of cash and in-kind contributions. I understand that the proposed budget anticipates the state's share to be $200,000 spread over the projected two year period of the study.

I believe it would be in the state's interest that a full time Project Coordinator (Water Quality) be engaged by the state for the duration of the project to serve in a liaison capacity with the Policy Board, the study staff, consultants, the IWRPB members, other concerned state agencies and my own office. It is also essential that a water quality engineer be added to the staff of the Water Compliance Unit of the state's Department of Environmental Protection to work full time providing input to the Housatonic River Basin Study. State funds are not available this fiscal year for either

of these positions. However, it is intended that during the second fiscal year of the project (July 1, 1975 to June 30, 1976), the state would be making a cash contribution equal to the cost of these two positions for the entire two year period (approximately $62,000). I trust you will agree with me in the importance of filling these positions at this time and that you can assure me that appropriated federal funds, as budgeted for this study will be made available to the State Government to fund these positions.

I am confident that joint efforts of the United States Army Corps of Engineers and the State of Connecticut in cooperatively administering the Urban Water Resources Management Study for the Housatonic River Basin, with the assistance of local governments, regional planning agencies and citizens will prove of great benefit in protecting the water quality, the natural environment and the beauty of this important area of our state.

Sincerely,

GOVERNOR

TJM:jkm

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I

J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203

July 19, 1974

Ref: NADPL-S

Major General R. H. Groves
Division Engineer
Department of the Army
North Atlantic Division, Corps of Engineers
90 Church Street
New York, New York 10007

Dear General Groves:

Thank you for your recent letter and the attached Plan of Study for the Housatonic Wastewater Study. We have reviewed the Plan of Study and believe it provides an adequate general approach for the development of a wastewater management plan. However, we believe a more definitive outline of proposed plan outputs is essential prior to initiation of planning activities.

Specific questions which have arisen during our review are:

1. How will the wastewater studies component interlock with the contemplated areawide waste treatment management planning programs of the State of Connecticut and areawide agencies?--also what is the interface with Connecticut's coastal zone management program?

2. What specific studies will be carried out and in what detail relating to combined sewer overflows and urban runoff, streamflow regulation, nutrient control and lake eutrophication, land use and non-point source control?

In order to facilitate the detailed development of the Housatonic wastewater planning effort, we are approving this initial Plan of Study with the understanding that more detailed information indicating specific study priorities, outputs and relationships will be submitted to EPA for approval during initial phases of the work.

We look forward to working closely with the Corps of Engineers and the State of Connecticut in this wastewater planning effort.

FOR THE REGIONAL ADMINISTRATOR

Sincerely yours,

Lester A. Sutton

Lester A. Sutton, Director
Air and Water Programs Div.

CC: R.B. Taylor)
D.M. Costle) State of Conn.

APPENDIX C

COORDINATION LETTERS

APPENDIX D

PROPOSED PLAN OF CONSERVATION AND DEVELOPMENT SUMMARY

The Proposed Plan of Conservation and Development for Connecticut

"The rapid growth experienced by Connecticut in the last two decades has been accompanied by a steady climb in the standard of living and per capita income of most of our citizens. But today we are increasingly made aware of costs which have accompanied this development. Major financial burdens have been imposed by rapid growth on municipal and state government. Taxpayers are all too familiar with the dollar costs of new schools, roads and sewers —as well as the intangible costs of wetlands, open spaces and natural streams lost forever.

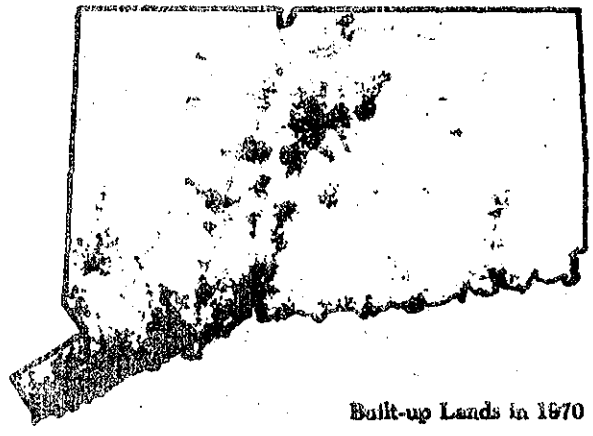
Connecticut has not yet been transformed into the endless urban sprawl found in much of the Northeastern United States. But as growth pressures continue to build within our state and from our neighboring states, it is increasingly necessary for Connecticut to direct overall growth so that high standards for environmental quality and fiscal responsibility can be maintained."

Hon. Thomas J. Meskill, Governor
from film entitled *Plan of Conservation and Development for Connecticut*

It used to be that few people gave population growth and development patterns a second thought. Most people never considered land as being a finite and possibly scarce resource that might need preserving. At one time, water was thought of as limitless.

However, recent years have seen a deepening concern on the part of the Connecticut citizen with the appropriate use of land and water resources. There is a very good reason for this concern, as Connecticut has become the fourth most densely populated state with over 3 million people living within its 5,000 square miles. Consequently, the opportunities for competition and conflict in the use of the land and water resources are greatly magnified. While the gross population density of the state has increased, the distribution of new residences, businesses and industries has taken place at lower net densities than in the past. Industries have sought stretched-out sites for one story buildings and ample parking; shopping centers have developed on hitherto rural land. Families have been building homes on larger lots. Continued development at these relatively low densities would eventually reduce Connecticut's hills and valleys to a vast suburbia—destroying both the natural environment and urban life—and creating a dispersed society impractical to serve with utility, health, education and other public services.

In response to these conditions there has developed a recognition of the need for a more comprehensive and coordinated approach to planning for proper use of our natural resource base and the exploration of improved ways to guide development consistent with public goals and needs.



Built-up Lands in 1970

The State of Connecticut has taken steps in response to this need through the establishment of closely related, technical programs for land use planning and water resources planning. The statewide land use effort, which emanates from the Planning Section, Planning and Budgeting Division of the Department of Finance and Control (formerly the Office of State Planning), was built upon a foundation of extensive municipal and regional work in land use planning as well as statewide work of the 1960's which was conducted under the Connecticut Interregional Planning Program. Water resources work is done as part of the Connecticut Water Resources Planning Program, which was established by the Clean Water Act of 1967. The Program is conducted as a cooperative interagency staff effort by the Department of Environmental Protection,

the State Department of Health and the Department of Finance and Control. Since 1970 constant cooperation and continuing exchange of technical information and ideas have taken place between the two programs. Due to the interrelatedness of land use and water resources, it was decided in 1972 to totally unify the work of both efforts and publish one document. The product of that unified effort is *The Proposed Plan of Conservation and Development for Connecticut.*

THE PLAN

The Plan of Conservation and Development is a set of written and mapped policies and recommendations—all proposed—that relate to the conservation and development of Connecticut's land and water resources. Of major importance is the fact that it identifies a larger role for state government in decisions relating to the use of Connecticut's land and water resources. As now structured, the decision-making process places the basic decision of appropriate land use in the jurisdiction of the planning and zoning commissions and boards of appeals of local governments, even though most basic public services and facilities are assisted either directly or indirectly by state and federal governments. These local and state programs are all too often seriously limited in their effectiveness by the lack of close coordination and agreement on overall objectives.

To properly represent the interests of the entire state in the social, economic and environmental effects of cumulative land and water use decisions, the Plan asserts that state government must assume a more direct role and exert a more positive influence on the land use decision-making process. Thus, the Proposed Plan of Conservation and Development calls for a partnership of state and local government and other affected interests in land use and water planning and implementation.

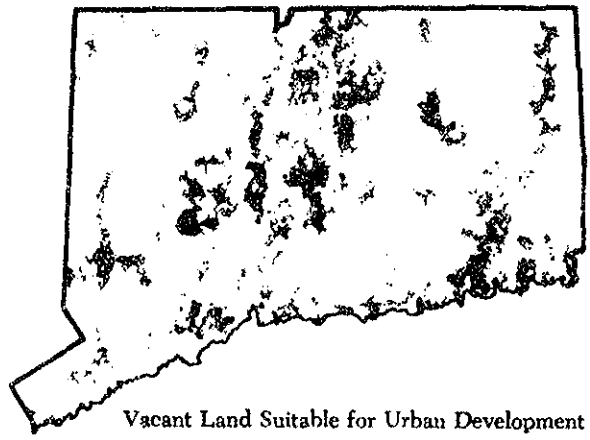
This partnership must be based upon a general framework of statewide land and water resource policy. Within this general framework, local and regional planning agencies would set forth the specifics of desirable land use form and the ultimate level and appropriate staging of future development. The varied programs and investments of state government would then be applied in a coordinated manner, working with local programs and private investment, toward the implementation of the Plan.

The basic policies recommended in the Proposed Plan are contained in the following box. Due to space limitations, the more specific policies and objectives set forth within the broad framework of those below could not be reviewed here.

In addition, the Proposed Plan of Conservation and Development contains several maps which depict either land and water recommendations of a geographic nature or general information related to conservation and development. One of the maps divides Connecticut into three land use categories designed to guide the use of land.

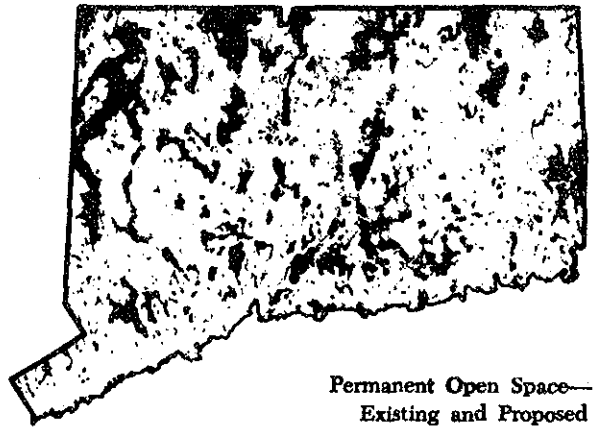
They are areas "Suitable for Urban Development," areas for "Permanent Open Space," and areas for "Limited Development."

Approximately one-quarter of the state is considered Suitable for Urban Development. These lands are considered suitable because they now—or are expected to have—public water and sewers, have access to major transportation arteries, and are on generally good land. They are also part of or close to existing urban centers. The category "Suitable for Urban Development" also avoids major water supply watersheds and other areas recommended as permanent open space.



Vacant Land Suitable for Urban Development

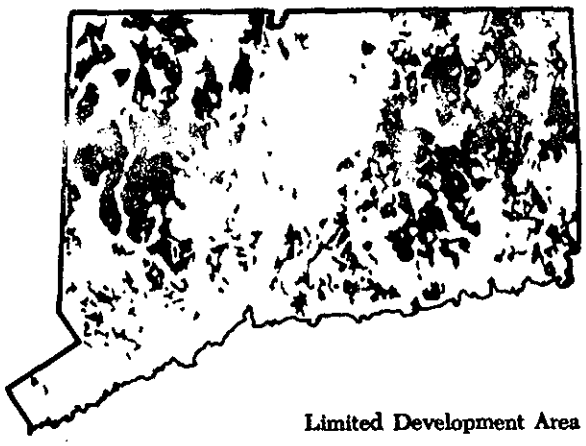
The Plan of Conservation and Development identifies another one-fourth of the state as appropriate for Permanent Open Space. Contained within this category are existing open space and recreation areas (public parks and forests, private natural preserves and utility lands), major coastal and inland wetlands, major sites identified by state government and regional planning agencies for recreation, existing and potential water supply reservoir sites and ground water supplies, ridges, mountains and major floodplains.



Permanent Open Space—
Existing and Proposed

The remainder of Connecticut has been categorized as "Limited Development." Included are major agricultural lands, lands which are poorly suited for urban development, and lands which make up the watersheds, excluding water supply reservoir sites.

A second map, entitled Urban Development Opportunities and Limitations, analyzes the Suitable for Urban Development areas in terms of the impact of development and its attendant wastes on water quality. Identified are locations within the Suitable for Urban Development areas that have either opportunities or limitations on the amount of urban development that could occur if clean water standards are to be met.



Limited Development Area

The Water Use Policy map graphically depicts policies related to water resource use. Shown are the proposed uses of key streams, water bodies and watersheds in the state, as well as the identification of high priority aquifers. The proposed uses are divided into three major categories: Water Supply, Water Based Recreation and Wastewater Receiving Streams.

There are three other major maps in the publication, one showing what the use of land was in Connecticut in 1970, another reflecting local zoning maps throughout the state as of 1970, which in composite, form a statewide zoning pattern, and a third depicting existing and potential conservation areas in the state, i.e. those areas having scenic, historical, ecological or other environmental qualities.

DISSEMINATION OF THE PLAN

When the Plan was being readied for distribution approximately one year ago, the set of recommendations (interpretations of technical information) was viewed as the initial step in a process of public policy development. Thus, heavy citizen involvement and public discussion and deliberation of the policies and of subsequent recommended changes was a critical prerequisite in the evolution of the Plan.

The Proposed Plan was released last January in the form of a 44-page report, complete with maps and pictures. In addition to the proposed policies and actions of the Plan itself, the report contains background information on work leading to the Plan, a brief recounting of the many factors which have and continue to effect growth and development in Connecticut, how the state has responded to that growth, and a detailed analysis of land use trends in Connecticut during 1960-1970, including where those trends are leading us if nothing is done. Approximately 8,000 reports have been distributed, mostly within the state. Also, a twenty minute film was produced, highlighting the issues and proposals in the Plan.

A sincere and extensive effort was launched to present the Plan for public discussion and to obtain suggestions and advice concerning Plan proposals. To provide a forum for public information and deliberation on the Plan, a series of workshop meetings were held this past spring, at least one in each of the 16 planning regions of the state. Also, an initial statewide workshop was held in February to which approximately 100 state, federal and local governmental officials were invited and asked to participate in discussing Plan content and means of implementation. The film was shown at all of the workshops, as well as on public TV, at subsequent meetings with public and private organizations and generally made available for public viewing. In addition, questionnaires especially keyed to the Plan were extensively used at these workshops as well as at many other meetings throughout the state. They proved extremely useful in gauging the reaction and attitudes of large numbers of people toward the Plan and its recommendations. Finally, the informality and candor of the workshop meetings provided valuable response and gave a feeling of priority to certain of the recommendations and identified other needs not directly addressed in the Plan. As an example of the latter, there was considerable interest shown for providing technical assistance to the more rural towns so that they can more adequately deal with conservation and development issues.

REACTION TO THE PLAN

A sizeable majority of the people attending the workshops were enthusiastic about the Plan and what it was saying. Of major importance to the staff were the comments and suggestions made by the citizens at these meetings. Many of the comments pertained to what should be done next. What follows is a summary of the major suggestions and opinions that have been expressed about the Plan. The summary is based primarily on comments and reaction received at the regional workshops, both during the discussion period and as indicated on the questionnaires. The workshops were attended by over 900 persons, of whom approximately 50% responded to the questionnaire.

The Plan Overall

- Reaction to the Plan was positive, with 81% of the questionnaire respondents indicating their overall impression of the Plan was either highly favorable or generally favorable (24% and 57%, respectively). On the other side, 4% felt it was unfavorable. In addition, 13% did not know and 2% did not respond.

Overall, the proposals were considered to be acceptable by most as long range goals for the conservation and development of land and water resources. However, people seemed to have some difficulty in addressing the broadness of the policies and showed a degree of impatience for more detail as to when and how the proposals would be carried out. Some people stated that the Plan was good theoretically but were skeptical of its practical value, either because they thought it too idealistic, or not specific enough to operate as definite guidelines, or not comprehensive enough. It was often felt that to be effective the Plan would need a host of programs and actions and to be viably implemented it must spell out in detail methods of handling each policy. Lack of detailed implementation measures was the single most important concern and this made many persons hesitate in their outright approval of the Plan.

- Statements were made both in favor of increased state involvement in land and water planning and against such involvement. Remarks against such efforts were made because it was felt it would undermine the home rule principle and interfere with local planning and zoning development controls. It was also felt that municipalities were more knowledgeable about problems and issues and could therefore plan for these better.

On the other hand, remarks critical of municipal involvement and favorable to state involvement were that local boards had insufficient technical understanding of the problems, that they were too influenced by political pressures or big developers and a check to this influence was needed, and that they only took a piecemeal approach to land and

water issues. Also, it was stated that towns act independently and often cannot even coordinate and reach a decision among their own local commissions. State involvement was most mentioned in connection with conservation policies, especially viewing water needs for the overall benefit of the state, though some felt that municipalities were also incapable of controlling development in an orderly manner.

- The questionnaire was designed to arrive at a more specific assessment of how strongly people felt about each particular policy, and where they thought primary responsibility lay for adopting and implementing that policy. The results which follow seem to agree with the Plan that more state involvement is needed.

Major Policy in Priority Order	Principal Responsibility	Strong Secondary Responsibility
1. POLICY #4	STATE	
2. POLICY #1	STATE	regional
3. POLICY #3	STATE	municipal
4. POLICY #6	MUNICIPAL	
5. POLICY #5	MUNICIPAL	regional-state
6. POLICY #2	STATE	municipal-regional
7. POLICY #7	MUNICIPAL	regional

In general, most agreed with the basic ideas of the Plan and felt that is was needed. If there was any criticism of the Plan's proposal, it was that the Plan did not go far enough in advocating increased state involvement.

- Almost without exception, respondents agreed with the Plan that there is a need for more coordinated action between state agencies and in interstate dealings, and felt the Proposed Plan would serve as an appropriate framework and should be applied in this respect as soon as possible.

- Quality of life and human ecology were cited as lacking in the Plan. Sociological aspects of density, housing and the disadvantaged and agricultural land were mentioned as areas not sufficiently covered.

Land Use—Potential conflicts between the Plan's proposed land uses and desires of private property owners was an issue at many workshops. Concern centered primarily on the permanent open space land use category as to what happens to those persons directly affected, what the restrictions might be for the next 10 years until the Plan is implemented, and what compensations will be given in return for any restrictions. Although some felt that the property owner should have the final say, others stated that there is a need to modify the individualism of the past in order to protect our resources. With respect to encouraging private participation in the implementation of the open space category it was suggested that the Plan (1) should develop new approaches to ease individual tax burdens in open space areas in order to prevent the squeeze between high assessments and loss of market value, (2) should consider means to relieve owners of liability when they allow their land to be open to the general public for recreational or open space usage, and (3) should be more specific in showing owners what alternative uses could be made of these lands.

Water Resources—There was considerable concurrence with the Proposed Plan that the need exists to protect both stream water quality and lands tributary to existing and proposed water supplies. The intertown and interregional aspects of water use policies was generally recognized and state involvement often urged. One suggestion was for a statewide water supply program directed by a state water authority. Other suggestions were for more definitive and enforceable state regulations aimed directly at providing for water supply development along stream courses.

Most comments about aquifers were supportive of the Plan's efforts though concern was expressed for better technical information of their location, safe yield, and depletion rates, or for exact determination of the surface recharge areas, development limits and suggested compatible uses for the recharge areas. Additional questions sought out current state involvement in these efforts and a general urging of continued state action so technical information could be available for state or local action. Others urged priority of surface systems over groundwater as little is known of groundwater yields.

Action to protect watersheds was brought up at most workshops and many participants felt this was an appropriate responsibility for the state. Stiffer regulation was the major suggestion though some felt that public ownership was the only sure means. Others desired specifics on optimum population or satisfactory uses and densities upon which to base decisions.

Recreation---The single most repeated criticism of the mapped policies and the chief recreational criticism was the extent of the Suitable for Urban Development shown along the shore of Long Island Sound. It was pointed out that this seemed to be in conflict with the Plan's recognition of the shore as a natural resource area. The lack of more specific recreation and open space proposals was also noted.

A chief concern was how the open space areas were to be obtained and/or protected without impinging on the rights of property owners by restriction, confiscation or use of eminent domain. The need for a specific program of state acquisition of recreation areas before urban sprawl negates the Plan was identified. Another observation was that the Plan must do more than "encourage," that what is needed is a policy of enforcement to preserve these lands. Several comments were made with respect to recreation and open space proposals in general being remote from urban areas and the need for specific programs to buy more open space in urban areas or provide mass transit to outlying sites.

State-Municipal Liaison—In discussing the relationship between the towns and the state on land use and water resources, the following suggestions were made:

- Advice from all towns must be sought; meet with each town individually to gather specific suggestions; each planning and zoning, economic development and conservation commission should be contacted to elicit specific changes.

- Before any legislative approval is considered, (1) disagreement between state, regional and municipal plans should be worked out, or (2) regions and towns should submit written reviews.

- Follow-up workshops should be held on a continual basis as each policy is given more thought.

- Become more cognizant of local plans.

- Stress selling of Plan to local towns as a guide and show how options can be maintained; or, get local planning and zoning commissions to adopt and support the Plan so long as they now have land use control responsibilities; establish minimum criteria and allow a specific time to elapse for local adoption.

- Work toward further legislation to strengthen municipal controls.

Assistance to Towns:

- *Financial*—demonstrate what financial assistance will be needed if the Plan is adopted and towns are to implement; show what the financial-fiscal effect will be on each municipality based on the Plan; illustrate what tax restructuring will

be necessary and why; what are the anticipated budgeting ... rams at the state level in conjunction with implementing ... as contended that only the state has revenue resources ...ure open space, recreation, etc.

● *Technical*—towns need technical assistance and given good information they can carry out many of the policies without state interference. Towns cannot afford the technical skills and this aspect is underemphasized in the Plan. It was stated that only the state has the adequate resources for providing effective guidance and for pioneering in many phases of the Plan's policies.

Concern for Population—One of the most frequent criticisms of the Plan was that it understates the population issue. According to some, ways must be developed to increase public control over population growth. For many persons this was advanced as a no growth policy, or at least a state program to seek a stabilized growth. Many also felt control of such growth required state action, since leaving it up to local options was no alternative. Other suggestions included developing population projections, instituting population and resource management programs, and tieing population limits to public services, water resources, water quality, energy or land capacity.

Economic Concern—Several criticized the Plan for the lack of an economic base. Similar remarks were that it does not contain an economic growth policy and ignores business and industry and the financial and social impact ... will have in each area.

...was said that taxing policies were key to implementation and that this fact does not come across in the Plan as it should.

Several persons criticized the lack of cost data or cost-benefit analysis associated with the policies. It was felt that a high cost was necessary to carry out many of the policies yet there were no funding programs or funding sources specified.

In addition to these issue-oriented topics, there were many constructive comments of a more specific nature dealing with the mapping of certain areas and the meaning of various mapped categories.

REACTION TO THE REACTION

What has happened to the Plan since these workshops were held?

A basic purpose of the Plan from the very beginning was to obtain public review and opinion concerning the proposed policies. Thus, all comments received at these workshops have undergone and are still undergoing close scrutiny and investigation. It should be understood that the entire planning effort associated with the Plan of Conservation and Development is a constantly changing situation where comments, reaction and suggestion are being fed into the picture on a continual basis.

Major staff emphasis has been placed upon developing and recommending the next steps in implementing the proposals. Work is progressing on detailing those specific actions which can and should be taken to carry out those proposals felt to be of priority concern as interpreted by the staff from both public and technical reactions received.

Staff of the Planning Section encourages and sincerely welcomes further comment and reaction to the Plan in their continuing effort to develop meaningful policy proposals and actions concerning the conservation and development of Connecticut's land and water resources.

PRINCIPAL MAPS IN THE PROPOSED PLAN

The policies of the proposed plan are reflected in graphic form on four Locational Guide Maps. Due to their complexity, these maps have not been reproduced in this pamphlet, however, the map categories are identified below. Original graphic work was done at a scale of one inch equals two miles.

Land Use Policy Map

This map is an overall guide to the use of land resources in Connecticut. Shown are three general land use policy categories:

- o Suitable for Urban Development - major areas of existing development as well as areas suitable for future growth. Minimum densities of two dwelling units per acre.
- o Permanent Open Space - existing public and private parks, forests and natural reserves as well as areas recommended for permanent protection by state agencies and regional planning agencies.
- o Limited Development - forests, farmland, water supply watersheds and small rural communities. Not suited for intensive development; needed for natural resource conservation. Development to occur at sufficiently low densities to preclude the need for future public water and sewer systems.

Water Use Policy Map

This map complements the Land Use Policy Map and shows recommended uses for all surface waters of Connecticut and major underground water supplies. Shown are three major categories:

- o Water Supply
  - existing and proposed reservoirs
  - watersheds tributary to water supply reservoirs
  - high priority aquifers
- o Water Based Recreation
  - recreation water body
  - limited use water body
  - planned recreational impoundments and diversion pools
  - major new or expanded saltwater beaches
  - major recreation streams
  - recreation stream
- o Streams Receiving Treated Effluent (must conform to state and federal water quality and discharge regulations)

Urban Development Opportunities and Limitations Map

This map identifies the relative opportunities and limitations for additional development based upon water quality and stream effluent receiving capabilities. The categories are:

- o Opportunities
  - immediate - public sewer and water services with additional capacities
  - long-range - areas suitable for urban development; no sewer/water service in near future
- o Limitations
  - water supply watersheds - urban services provided only to a level necessary to eliminate existing public health hazards (not suitable for urban development)
  - stream quality limitations - sewer services severely constrained by water quality and stream flow problems
  - conditional long-range expansion - adjacent to areas with stream quality limitations; not suited for intensive urban development until limitations are overcome using advanced waste treatment processes

Conservation Areas

This map depicts major natural resource areas, which should be maintained in order to retain a ecological balance and the aesthetic qualities of the state, and includes scenic; cultural and historic resources. Shown are eight general categories:

- o Scenic ridges or valleys
- o Traditional villages having historic or attractive qualities of statewide significance
- o Wetland areas
- o Water supply areas both existing and potential water supply watersheds and reservoirs
- o Potential aquifers
- o Major agricultural areas
- o Major natural flood prone areas
- o All waterbodies

OVERALL PLAN POLICY

State government must take a leadership role in establishing a land and water resource decision-making structure which will adequately ensure the interests and the participation of all affected parties.

POLICY NO. 1

Establish and protect sufficient water supply sources to meet future water supply needs.

1a. The future water supply needs of the state should be met, in part, through those water supply reservoirs, diversions and high priority underground sources (aquifers) depicted on the *Water Use Policy* map.*

1b. As a general principle, water supply should be obtained from groundwater resources before resorting to the creation of new impoundments.

1c. The state should develop mechanisms to protect and preserve the 91 water supply sites identified. Although future studies may show some of these sites to be less desirable than others, all should be protected.

1d. Until the water yield obtainable from high priority underground sources (aquifers) identified on the *Water Use Policy* map, all uses of the land above these aquifers should be limited to present activities.

1e. The watersheds tributary to the water supply reservoirs delineated on the *Water Use Policy* map should be managed to ensure the quality of the impounded waters for their intended purposes.

1f. Continue the practices of not permitting direct waste discharges into streams tributary to public water supplies and not constructing water supply facilities which would be fed by wastewater receiving streams.

1g. Limit the discharge of liquid wastes to those "wastewater receiving streams" and "recreation and wastewater receiving streams" identified on the *Water Use Policy* map.*

1h. Lands which are presently maintained in an open state for the purpose of protecting a public water supply should be continued to be maintained in that state.

POLICY NO. 2

Provide a wide variety of high quality outdoor recreational opportunities to all citizens with highest priority given to the purchase and development of facilities in and near the state's urban areas.

2a. In the purchase and development of recreation areas, give top priority to sites within and close to major population centers.

2b. In the building of new and the rebuilding of old urban areas, ensure consideration of the potential use of rivers for recreational and aesthetic purposes.

2c. Expand and modernize camping facilities with priority given to locations near multi-purpose intensive recreation centers.

2d. Protect existing recreational trails and develop new ones.

2e. Take advantage of every opportunity to increase the amount of shoreline land available to the public for recreational use.

2f. High priority should be given to increasing opportunities for public access to saltwater swimming through consideration of expansion of existing facilities and development of new facilities.

2g. For water-based recreation expenditures, the state should give first priority to the acquisition and/or construction of beaches, diversion pools and new water recreation sites and the improvement of existing water recreational areas, all identified on the *Water Use Policy* map.*

2h. In watersheds which drain into recreational water bodies, residential, commercial or industrial development should be limited to that which is fully compatible with clean water-based recreation.

2i. Under certain conditions, swimming should be allowed in storage reservoirs, but not in terminal reservoirs.

2j. The practice of discouraging the construction of new impoundments solely to satisfy a state-oriented recreation demand should be continued. However, when impoundments are being created for other purposes, consideration should be given to the provision of recreation.

2k. Actively pursue the acquisition of boating and fishing access rights on those recreation streams and recreation impoundments identified on the *Water Use Policy* map.*

2l. Attempt to provide at least one state access point for boats in each town bordering Long Island Sound.

POLICY NO. 3

Protect the scenic, historic and natural resources of Connecticut from premature, uncontrolled or incompatible development.

3a. Preserve the heritage of Connecticut through a strengthened program of historic preservation and careful development.

3b. Encourage continuation of major agricultural and forest areas of the state in their present use in accordance with the *Land Use Policy* map.*

3c. Give full support to the conservation of the natural beauty and historic character of the Connecticut River valley.

3d. Ensure that consideration is given to the utilization of sand and gravel deposit locations for groundwater supply, mineral extraction and/or solid waste

deposit purposes before decisions precluding such uses are made.

POLICY NO. 4

Protect rivers and lake shores, flood plains and coastline from environmentally destructive alterations and development.

4a. Establish regulations to control the flow of water in streams affected by impoundments, diversions or well fields.

4b. In the next stage of the water pollution abatement program, priority should be given to the elimination of raw discharges from combined storm and sanitary sewer systems.

4c. *Ensure that environmental implications* are given full consideration in decisions *relating to the filling of,* or construction over or adjacent to, Long Island Sound.

Ensure that the people in Connecticut *are adequately protected from potential floods.*

POLICY NO. 5

Direct urban development to those areas identified as Suitable for Urban Development, preferably close to existing urban, commercial and employment centers.

5a. Utilize the timing and placement of water and sewer lines to direct urban growth and promote high quality development.

5b. Concentrate state and federal aid for major urban services in areas identified as Suitable for Urban Development.

5c. Encourage the location and relocation of business and industry within areas *identified as Suitable for Urban Development.*

5d. *Give high priority to the revitalization* of the physical, social and economic structure of the central cities.

5e. To prevent haphazard urban development in rural areas, require development in areas shown as Limited Development on the ***Land Use Policy*** * map to be of such use and density as to ensure that on-lot water supply and waste disposal systems will function indefinitely.

POLICY NO. 6

Encourage urban development to be at sufficient densities for the economic provision of services.

6a. Encourage the provision of both public sewer and water service in all new development where either service will be needed.

6b. Encourage residential development in those areas identified as Suitable for Urban Development to be at densities of one dwelling unit or more per half acre of residential land.

POLICY NO. 7

Promote staged, contiguous development within areas Suitable for Urban Development.

7a. Stage the construction of sewer lines in such a manner as to discourage sprawl.

7b. Encourage larger scale, innovative private development projects which provide opportunity for greater variety and choice of lifestyle and economy in the provision of public services.

7c. Urban development should be staged in accordance with the criteria and priorities, as reflected in the ***Urban Development Opportunities and Limitations*** *map.**

7d. Certification of availability of sewer and water service should be obtained prior to approval of any new construction in sewer and water service areas.

POLICY NO. 8

Encourage decisions relating to major conservation and development actions to be made in accordance with the locational guide maps of the Plan, and with the key policies of conservation and of development.

8a. Provide for a comprehensive review of all state policies and/or programs that impact state land use policy.

8b. Ensure that emphasis of state programs fosters Plan policies and that such emphasis is reflected in the capital and operating portions of the State Budget.

8c. Ensure that program planning efforts *of state and other agencies* are coordinated and result in program plans which are generally consistent with the Plan of Conservation and Development.

8d. Establish a mechanism for relating proposals on new communities with the Plan of Conservation and Development.

POLICY NO. 9

Encourage the use of the Plan of Conservation and Development as a guide in the review of projects and proposals and in assessing the need for amended or new legislation.

9a. Encourage state, regional and other agencies to use the Plan of Conservation and Development as a primary guideline in reviewing all applications for those federal aid programs for which review is required.

9b. Encourage regional planning agencies to review regional and local plans of development, zoning regulations, subdivision regulations, and sewer and water plans in relation to the Plan of Conservation and Development.

9c. Undertake a review of existing legislative authority for conservation, development and related programs and activities in order to assess the need for new or amended legislation.

POLICY NO. 10

Encourage local participation in conservation and development activities.

10a. Encourage towns to make broader use of existing developmental controls and enable towns to adopt new and strengthened development tools.

10b. Strive to reform the tax structure so as to reduce the financial pressures on towns and cities and which contribute to deteriorating structures, urban *sprawl, inability to absorb low-income* housing, and diseconomies of scale.

* FOR DESCRIPTION OF MAPS, SEE BOX